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Bulletins on disease subjects written for farmers and "popular" articles of a similar nature are not included in the *Veterinary Bulletin*. Those of a sufficiently important nature are, however, included in *Index Veterinarius*; so also are certain review articles, presidential addresses, congress proceedings, etc., where the title conveys as much information as could be given in an abstract of a few lines. For information of this nature, readers of the *Veterinary Bulletin* are referred to *Index Veterinarius*, where titles of all publications indexed by the bureau are fully cross-referenced.

A list of annotations and reviews, classified according to subject, is now given in *Index Veterinarius*, being inserted at the end of each number. Such papers will not necessarily be dealt with in the *Veterinary Bulletin*.

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DISEASES CAUSED BY BACTERIA AND FUNGI

BUTAYE, R. (1948.) Recherches sur les streptocoques β hémolytiques à zone large du groupe sérologique A et de provenance animale. **[Research on β haemolytic streptococci (wide zone) of serological group A, of animal origin.]** —*Acta biol. belg.* **3.** 74–76. 1

Eight strains (three from horses and five from cases of bovine mastitis) of wide zoned β-haemolytic Group A streptococci were found to be trehalose + and sorbitol −. They reduced methylene blue (1 : 15,000) and caused no fibrinolysis. B. concluded that these strains were of animal and not human origin and demonstrated that, although similar, their antigenic structure differed from Group A streptococci of human origin.—J. I. TAYLOR.

GRINI, O., FLATLA, J. L., & HAUGE, S. (1949). Infeksjon med humane streptococcer i juret hos to kuer. **[Infection of the udder in two cows with human type streptococci.]**—*Nord. Vet.-Med.* **1.** 57–61. [Abst. from English summary.] 2

Two cows belonging to a small herd were infected with human type streptococci by a cowman with scarlet fever, who had inserted a probe in the teats of the cows. Both cows excreted streptococci in the milk for about 3½ months. After the cows had calved the affected glands were normal.

The streptococci formed type P colonies. They were virulent for mice and were fibrinolytic. They gave no cross-reaction with group N. The authors raise the question whether spontaneous infections of the udder in cows with human type streptococci may be of a transitory character. This is the first time that human type streptococci have been demonstrated definitively as the cause of mastitis in cows in Norway.

GOLDFINGER. (1948.) Sur la mammite streptococcique. **[The prevalence of chronic mastitis (bovine) in Poland.]**—*Bull. Off. internat. Epizoot.* **30.** 310–313. [In English.] 3

Examination of milk samples from 733 cows (2,922 quarters) from 19 herds revealed that 33·99% (10·38% of the quarters) were infected with *Streptococcus agalactiae*, 2·18% (0·65% quarters) with *Str. dysgalactiae*, 3·0% (0·98% quarters), with other streptococci, 15·23% (5·94% quarters) with micrococci and 0·68% (0·23% quarters) with *Bact. coli.*

G. discusses the value of indirect methods of diagnosis as compared with culture tests.—J. I. T.

STABLEFORTH, A. W., HULSE, E. C., WILSON, C. D., CHODKOWSKI, A., & STUART, P. (1949.) **Herd eradication of *Str. agalactiae* by simultaneous treatment of all cows with 5 doses of 100,000 units of penicillin at daily intervals and disinfection.**—*Vet. Rec.* **61.** 357–362. 4

Of 424 cows in ten herds, 148 (32%) were infected with *Streptococcus agalactiae*. All quarters of all cows were treated with five doses daily of 100,000 units of penicillin, the premises were disinfected and penicillin cream was applied to the milkers' hands and to the teats during and for a week after treatment. Any cows added to a herd, or which were infected subsequently, were given similar treatment.

After treatment, five herds were freed from infection immediately, and one herd three weeks later. Five of these six herds remained free from infection for 12–24 months. The introduction of infected cows caused considerable spread of *Str. agalactiae* in such herds but after additional treatment these became clear. Seven of the nine herds remained clear for 24 months. Observations were discontinued on the tenth herd through lack of farm co-operation.

In all herds *Str. agalactiae* was recovered from a high percentage of teats, from milkers' hands and from a variety of other sites.

After treatment the incidence of clinical mastitis was greatly reduced and the milk yields increased.—J. I. TAYLOR.

STULTS, A. W. (1949.) **Treatment of *streptococcus mastitis* by udder infusion.**—*Rep. N.Y. St. Ass. Milk Sanit., 1948.* pp. 109–121. 5

S. describes a programme of research on the incidence and control of mastitis in New Jersey

State. Penicillin was employed in the treatment of *Str. agalactiae* mastitis and the results are tabulated in terms of vehicle, length of administration and dosage. Emphasis is laid upon the fact that maintenance of effective drug concentration for at least 72 hours is the decisive factor in successful treatment. For this reason, S. favours the use of penicillin in an emulsion of oil, water, preservative and lanolin derivative. He considers that one half unit of penicillin per ml. of milk is an effective therapeutic agent, if maintained for a sufficiently long period.

The practical aspects of the problem are discussed and brief reference made to the use of penicillin, tyrothricin and some of the sulpha drugs, in other forms of mastitis.—E. F. Lewis.

Spencer, G. R., & Kraft, M. E. (1948.) **Penicillins G, K, and F in the treatment of chronic bovine streptococcic mastitis.**—*Cornell Vet.* **38.** 358–363. 6

Experiments are recorded to determine the therapeutic efficacy of penicillins F, G and K for the intramammary treatment of streptococcal mastitis. The vehicle used throughout was a mineral oil-water mixture, and the final preparation contained 25,000 Oxford units per single dose of 10 ml. Diagnosis depended on the Hotis test, microscopic examination of incubated milk samples, and streak plating of incubated samples on azide blood agar.

Infected cows were divided into groups according to herd, stage of lactation and the number of infected quarters. All the infected quarters of an individual were treated with the same type of penicillin in three doses of 25,000 units at 24-hour intervals. The cows were re-examined (using similar technique) at weekly intervals for three successive tests, beginning about one week after treatment. A quarter was considered cured when milk samples were negative to culture on three successive weekly tests. The control group of infected cows was treated using only 10 ml. mineral oil-water mixture without penicillin. A total of 179 quarters was treated using all the penicillins, and infection was eliminated in 65%.

The different types of penicillin appear similar in therapeutic value, but the authors consider that further work is necessary to determine the actual value of penicillin K in streptococcal mastitis. Crude penicillins are approximately as efficacious as the purified types and by-products in the production of crystalline penicillin G may be utilized for intra-mammary therapy. An *in vitro* and *in vivo* pharmacological study was made on each penicillin type and a report is to be published later.—K. B. Sinclair.

Schlingman, A. S., & Manning, M. C. (1949. **Penicillin ointment in the treatment of chronic bovine mastitis.**—*Vet. Med.* **44.** 382–388. 7

The report advocates the use of calcium penicillin, incorporated in a bland ointment base and contained in collapsible tubes (50,000 units in 3·6 g. base). The authors tabulate the preliminary bacterial findings, schedules of treatment and results obtained in 11 cases. Under the conditions employed, from 1–10 treatments (average 5+) were required to eliminate streptococci and staphylococci from 22 out of the 25 infected quarters, the best results being obtained when the penicillin was administered at 12-hourly intervals. Streptomycin was employed with beneficial effect in three cows found, after treatment with penicillin, to be infected with organisms of the *coli-aerogenes* group.—E. F. Lewis.

Olson, J. C., Jr., Schipper, I. A., & Schmitz, M. E. (1949.) **Preliminary observations on the biochemical and serological characteristics of coliform organisms isolated from cases of acute mastitis.**—*J. Dairy Sci.* **32.** 721. [Only abstract given, abst. from abst.] 8

The object of this study was to obtain information regarding the heterogeneity or homogeneity of coliform bacteria isolated from cases of acute bovine mastitis. Consequently, extreme care was taken to exclude external coliform contaminants. Sufficient colonies were picked from individual plates to make reasonably certain that representative cultures of types present on the plates were obtained. No evidence was obtained, during the study of any of the cases, which would indicate that organisms other than coliform were etiological agents. Seventy-six cultures were isolated and classified. The cultures could be segregated into two sharply defined biochemical groups, those typical of *Aerobacter aerogenes* and those typical of *Escherichia freundii*.

At least two serological types were represented in the 76 cultures studied.

Wilson, R. A. S., & Lancaster, J. E. (1949.) **Bovine mastitis caused by Diplococcus pneumoniae (Pneumococcus).** — *Vet. Rec.* **61.** 349. 9

One Jersey and one Ayrshire cow from the same herd were found to be affected with acute mastitis which later caused them to go dry. Large numbers of Type III pneumococci were recovered from the udder secretions. Broth suspensions of the organism caused acute mastitis when injected into the teat canal or when rubbed on the teat orifice of an uninfected cow. Injection of the original udder secretions into mice caused death in 24 hours, encapsulated diplococci being recovered from the heart-blood.—J. I. Taylor.

Vallée, A. (1949.) Septicémie à pneumocoque chez le veau. **[Pneumococcal septicaemia in**

calves.]—*Bull. Acad. vét. Fr.* **22.** 193–194. **10**

An acute septicaemia in a four-day-old calf is described in which a pneumococcus was implicated as the causal organism.—D. Luke.

Goret, P., Collet, P., Pérès, G., Pérès, G., Joubert, L., & Courouble, G. (1948.) A propos d'une petite enzootie de fièvre charbonneuse des bovins dans la région lyonnaise. Le charbon bactéridien en France.—Traitement et guérison de l'infection déclarée, par la pénicilline. **[Enzootic anthrax in cattle in the Lyon district. Penicillin treatment.]**—*Rev. Méd. vét., Lyon et Toulouse.* **99.** 241–252. **11**

The distribution of anthrax in France is discussed. Anthrax, formerly considered fatal in cattle, is claimed by the authors to be curable, even in the most severe cases of bacteraemia, by penicillin therapy. Penicillin by itself is successful and no advantage is to be gained by combining the penicillin treatment with anthrax anti-serum or novarsenobenzene (neoarsphenamine). The authors used both the intravenous and intramuscular routes for the injection of penicillin. The dosage is dependent upon the stage of the disease and a strict temperature control is of value in assessing the dosage. Cure has been effected in two days by treatment with two million units of penicillin.—Marcus S. Brooke.

Prokůpek, K. (1949.) K rozšíření sněti slezinné v ČSR. **[Anthrax in Czechoslovakia.]**—*Čas. československ. Vet.* **4.** 249–251. **12**

P. gives a statistical review of anthrax in cattle in Czechoslovakia during the years 1911–48. The yearly average was 2·7–4·4 cases per 10,000 head of cattle. In the post-war period there have been about 450 cases in the country each year of which 90% occurred in Slovakia. One hundred and thirteen cases were reported in human beings between 1923 and 1948.—E. G.

Mohan, R. N., & Ali, S. M. (1948.) **Some aspects of anthrax in Bengal.**—*Indian J. vet. Sci.* **18.** 1–15. **13**

A survey of anthrax since the inception of the Civil Veterinary Department in Bengal has been made. The disease was recognized to occur in 1892 and the heaviest mortality recorded was during 1918–19. The average number of deaths in cattle from anthrax was 2·6% of the total mortality from contagious diseases. The mortality rate in affected animals was 70–75%. The disease was much commoner in cattle than in other domesticated animals.

The incidence of anthrax reached its maximum during April-July when the mean temperature and humidity are moderately high and rainfall moderately heavy. In the winter months the incidence is at its lowest. Most of the outbreaks occur in the Ganges-Brahmaputra deltaic area.

Anthrax spore vaccine was found to be safe for lactating as well as for pregnant animals. Immunity seems to be sound for five months. On economic and technical grounds large-scale vaccination is not recommended, but prophylactic vaccination has been advised for valuable animals and others in badly affected areas.—P. R. N.

Viswanathan, G. R., Pillai, M. R., & Ayyar, S. V. (1948.) **Observations on the use of anthrax spore vaccine in Madras.**—*Indian J. vet. Sci.* **18.** 17–19. **14**

The authors record that the reaction following vaccination with anthrax spore vaccine in goats was rather severe while there was hardly any reaction in other animals. More than 22,000 sheep and goats, 700 cattle and buffaloes and 120 elephants were vaccinated.—P. R. Nilakantan.

Jennings, A. R. (1949.) **The distribution of tuberculous lesions in the dog and cat, with reference to the pathogenesis.**—*Vet. Rec.* **61.** 380.–385. **15**

J. found that 11 out of 165 dogs and 13 out of 100 cats examined in Liverpool were tuberculous. Of seven dog strains four were of the bovine and three of the human type. All six of the feline strains were of bovine type. The gross appearance and distribution of the lesions are described.

It was concluded that in five of the canine cases infection was by the respiratory route and that it was of alimentary origin in two ; infection was by the respiratory route in one cat and by the alimentary tract in eleven.—D. Luke.

McDiarmid, A. (1948.) **The occurrence of tuberculosis in the wild wood-pigeon.**—*J. comp. Path.* **58.** 128–133. **16**

Ten cases of infection with acid-fast bacilli were encountered during P.M. examination of 66 wood-pigeons, shot in Oxfordshire. Apart from emaciation, in eight specimens there was darkening of the plumage with loss of sheen. The tubercles found in the internal organs, except for their yellow-orange colour, resembled those occurring in TB. of the domestic fowl and affected the alimentary tract in five cases. Six strains of the avian type tubercle bacillus were recovered culturally from the nine pigeons with macroscopic lesions and proved fully virulent for fowls and rabbits, less so for pigeons and avirulent for g. pigs.

All the fowls and g. pigs tested and a single infected pigeon were markedly sensitive to an intradermal injection of avian P.P.D. and slightly so to mammalian P.P.D., three weeks after infection. Avian tubercle bacilli were recovered by culture of the organs of infected fowls, rabbits and pigeon, but not from the iliac and lumbar

lymph nodes of the g. pigs, killed after six weeks. The incidence of infection with acid-fast bacilli in 52 unselected wood-pigeons was 3·85%.

—R. O. Muir.

Packalén, T. (1946.) **Multiple infection in experimental tuberculosis in animals.**—*Acta tuberc. scand.* **20.** 199–211. [In English. Abst. from author's summary.] **17**

The findings from experiments can be summarized as follows: (I) The stock of g. pigs employed was a carrier of one to three latent, but potentially pathogenic, bacterial infections, *i.e.*, Gram-negative rods of the type *Brucella bronchiseptica*, pneumococci type 19 or haemolytic streptococci of Lancefield's group C. (II) A progressive tuberculous infection in the g. pigs could cause these latent infections to flare up and spread; this occurred not only shortly before death but even at a quite early stage of the TB. (III) Intranasal instillations of broth could also activate such latent infections, but these infections were usually overcome by the host. (IV) If, however, the instillations were performed on tuberculous g. pigs, the activated pyogenic infection became severe and in its turn accelerated the progress of the TB.; a vicious circle arose between the TB. and the pyogenic infection or infections.

The observations here recorded emphasized the possibility that in experimental animal TB. there may be a multiple infective mechanism. The observations made in experimental TB. in g. pigs provide some support for the conception that in human TB. there is also a multiple infective mechanism.

Further investigation is required to show how frequently latent pyogenic infections occur in g. pig stocks.

After the completion of the experiments reported above 45 g. pigs, used in routine inoculation tests for tubercle bacilli, were examined for the presence of non-specific infection. There was evidence of pyogenic infections in these animals.

Ebert, R. H., Ahern, J. J., & Bloch, R. G. (1948.) **Development of tuberculous infection. *In vivo* observations in the rabbit ear chamber.**—*Proc. Soc. exp. Biol., N.Y.* **68.** 625–633. **18**

The components of the rabbit ear chamber are described with illustrations as well as the method of insertion on to the rabbit's ear. Microscopic studies of the pathological changes in the tissue within the chamber, following infection with a bovine strain of tubercle bacillus, demonstrated a minimal early reaction to the presence of live tubercle bacilli and at a later stage a sudden, necrotizing response which coincided with the development of cutaneous hypersensitivity, shown by systematic intradermal tests with old tuberculin. Venous thrombosis caused by progressive vascular damage was observed to play an important part in local destruction of tissue.

Details of experimental technique and microscopic observations were recorded in Kodachrome motion pictures. The application of similar methods was recommended for microscopic study of the dynamics of tissue changes in other pathological conditions.—R. O. Muir.

Eggerth, A. H., Dresher, E., & McOsker, V. C. (1948.) **Infection of chick and duck embryos with tubercle bacilli.**—*Amer. Rev. Tuberc.* **57.** 632–639. [Spanish summary. English summary and conclusions copied *verbatim.*] **19**

The chick embryo of six to eight days of age is most susceptible to infection with tubercle bacilli. Older embryos are much more resistant. Chick passage of one strain of *M. tuberculosis* increased its virulence for the chick embryo. The duck embryo has no advantage over the chick embryo except when the inoculation is made into the amniotic cavity.

Milzer, A., & Levine, E. R. (1948.) **A rapid mouse test for laboratory diagnosis of tuberculosis.**—*Proc. Soc. exp. Biol., N.Y.* **69.** 16–17. **20**

The virulence of suspensions, containing approximately the same dose of several recently isolated strains of mammalian type tubercle bacilli, in gastric mucin, egg yolk and saline diluents, was compared for albino and pigmented strains of mice by intraperitoneal injection. Groups of 12–18 mice were used and all animals were killed for P.M. examination ten days after inoculation, when macroscopic lesions were sought at the site of inoculation and in the liver, spleen and intestinal lymph nodes. Routine impression smears of gross lesions were made as well as of the spleen and liver, since a few tubercle bacilli were usually demonstrable in the latter organs, in mice injected with suspensions of tubercle bacilli in gastric mucin, even in the absence of macroscopic lesions in them.

Gastric mucin was found to enhance the virulence of one mammalian strain of the tubercle bacillus for pigmented strains of mice, when compared with egg yolk and saline diluents, and much more than for albino mice. In mice injected intraperitoneally with suspensions in gastric mucin of the doses and strains of tubercle bacilli studied, gross macroscopic lesions containing numerous tubercle bacilli usually developed after ten days. Several isolations of tubercle bacilli from human patients were made 10–15 days after injection by the inoculation of a suspension of suspected material in gastric mucin into pigmented mice.

Moreover, the number of isolations from patients was recently increased by maintaining

mice, inoculated with suspensions in gastric mucin, on the cornmeal-gelation-butter diet of Dubos and Pierce.—R. O. Muir.

Šula, L. (1948.) **A liquid ascitic medium for the isolation of *Mycobacterium tuberculosis* from pathological material.**—*Publ. Hlth Rep., Wash.* **63.** 867–883. **21**

The preparation of a liquid ascitic medium is described which was found to be as suitable for the isolation of tubercle bacilli from pathological materials as the egg media now in routine use. Prepared in a concentrated form, the medium had the advantage of being dispatchable to outlying diagnostic laboratories, where required amounts of medium could be made without delay by diluting the concentrate 1 : 10 with sterile distilled water.

The medium was of equal value for the isolation of human, bovine and avian strains of tubercle bacilli. While human and bovine types of bacilli grew identically in the medium, forming a granular deposit which settled down quickly when shaken up, the growth of bovine strains was slower. Avian strains formed a flaky deposit which could be shaken into a nearly homogeneous suspension and a surface pellicle was rarely formed. Acid-fast, saprophytic bacilli, if they did not produce diffuse turbidity or pigmentation, were distinguished by their much faster growth rate, best demonstrated by subculture, although confirmatory inoculation was best made in g. pigs and rabbits.

Comparative cultural examinations of 2,562 samples of the usual range of infectious materials gave positive results on egg media in 16·6% of cases; on the ascitic medium in 18·2%; and by inoculation of g. pigs in 16·2%. While 5·9% of the cultures on egg media and 4·3% of those in the ascitic medium were contaminated, intercurrent disease caused the deaths of 8·8% of all experimental g. pigs used for diagnosis. Corper-Cohn's egg-yolk medium and Dubos' Tween [a surface active agent]-albumin medium were regarded as unsuitable for the primary isolation of tubercle bacilli from pathological material because of their tendency to secondary contamination.

The efficacy of the ascitic medium, for the isolation of tubercle bacilli from material containing only a very few bacilli, was demonstrated by the results of cultural examination of laryngeal swabs, taken from patients who were not expectorating.

The condemnation of the use of liquid media for primary isolation of tubercle bacilli by the Committee on Evaluation of Standard Laboratory Procedures was criticized on the grounds that the ascitic medium did not possess the two basic disadvantages ascribed by the Committee to liquid media in general.—R. O. Muir.

I & II. Lurie, M. B., Abramson, S., & Allison, M. J. (1949.) **Constitutional factors in resistance to infection. I. The effect of estrogen and chorionic gonadotropin on the course of tuberculosis in highly inbred rabbits. II. The effect of estrogen on tuberculin skin sensitivity and on the allergy of the internal tissues.**—*Amer. Rev. Tuberc.* **57.** 168–185; & 186–197 [Spanish summary. Authors' summary and summary and conclusions copied *verbatim.*] **22**

III. Lurie, M. B., Abramson, S., Heppleston, A. G., & Allison, M. J. (1949.) **Constitutional factors in resistance to infection. III. On the mode of action of estrogen and gonadotropin on the progress of tuberculosis.**—*Ibid.* 198–218. [Spanish summary. Authors' conclusions copied *verbatim.*] **23**

I. In highly inbred, sexually mature rabbits estrogen in large doses uniformly retarded the progress of the disease at the site of intracutaneous inoculation, diminished the extent of the disease in the internal organs, and suppressed to a considerable degree its dissemination in the body. In immature rabbits the estrogen was less effective on the spread of the disease. In a smaller group of highly inbred rabbits the periodic administration of chorionic gonadotropin, which induced corpora lutea in the ovary in the earlier phase of the disease, uniformly enhanced the progress of the disease at the site of intracutaneous inoculation, increased its dissemination in the body, and in the majority of instances aggravated its extent in the internal organs. Ovariectomy or the daily combined injection of physiologic amounts of progesterone and estradiol exercised no effect. The possible significance of these hormone effects in the pathogenesis of puberty tuberculosis in the human female is discussed.

II. Estrogen reduced the inflammatory response of the skin to tuberculin in rabbits sensitized by active tuberculosis or by treatment with heat-killed tubercle bacilli by virtue of the depressing effect of the hormone on the inflammatory irritability of the skin to bacterial irritants in general. The acquisition of intrinsic allergic sensitivity of the tissues in general, as well as that of the skin, is not reduced by estrogen administration.

III. Estrogen retards the progress of tuberculosis at the portal of entry in the skin and diminished its dissemination to the internal organs in highly inbred rabbits chiefly by reducing the permeability of the connective tissue. Chorionic gonadotropin enhances the disease at the portal of entry and its spread through the body mainly by increasing the permeability of the connective

tissue. Hyaluronidase exerts a greater spreading effect in estrogen-treated animals than in rabbits under the influence of gonadotropin. Estrogen reduces the number of circulating lymphocytes of the blood. The intermediation of the adrenal cortex in this effect was not demonstrated. Tuberculosis *per se* induces a marked hypertrophy of the adrenals in rabbits.

The reduction of the inflammatory responsiveness of the skin to the products of tubercle bacilli induced by estrogen is not a significant factor in this hormone's capacity to retard the tuberculous process. Estrogen and gonadotropin exert no effect on antibody formation. Estrogen markedly suppresses the development of amyloid degeneration in the spleens of tuberculous rabbits.

GRÄUB, E. (1949.) Über die Bekämpfung der Rindertuberkulose. [**Control of bovine tuberculosis.**]—*Schweiz. Arch. Tierheilk.* **91.** 15–23. **24**

Discussing various methods of control of bovine TB., G. considers the American stamping-out method the surest way of dealing with the infection. Ostertag's method had a certain measure of success, but was abandoned early.

Bang's milder method and its modifications have proved successful in lightly affected areas, but less so where herds were heavily infected. The effectiveness of both methods is limited because of the infectivity of the organism in the faeces.

Methods of immunization with BCG vaccine, with the human and vole organisms, and with the P strain of the bovine variety are outlined and their relative merits discussed.—G. P. M.

KRESS, F. (1948.) Ueber die Wirkung von Ultraschall auf Tuberkulosekeime von Typus humanus und die Möglichkeit einer Schutzimpfung gegen die Tuberkulose. [**Ultrasonic waves and tubercle bacilli.**]—*Wien. klin. Wschr.* **60.** 597. [Abst. in *Amer. Rev. Tuberc.* **59.** p. 52 of abstracts. (1949), copied *verbatim.*] **25**

Human tubercle bacilli can be damaged by exposure to ultrasonic waves so that they stop multiplying. These tubercle bacilli no longer cause tuberculosis in the guinea pig but, if injected, they produce some immunity to subsequent infection with virulent tubercle bacilli. It can be expected that tubercle bacilli which have been exposed to ultrasonic waves will be used for prophylactic vaccination of human beings.

RUBBO, S. D., WOODRUFF, P. S., & MORRIS, D. M. (1949.) **A rapid method of determining streptomycin sensitivity of** *Mycobacterium tuberculosis.* **[Correspondence.]**—*Nature, Lond.* **164.** 313–314. **26**

Using a method based on immersing a smeared slide in Youman's medium dispensed in small test-tubes, the authors claim that results can be obtained in seven days providing tubercle bacilli can be seen, by direct smear, in the untreated sputum specimen. Tubes containing 0 (control), 1, 10 and 100 μg. streptomycin in the medium are put up in duplicate. The slides from the controls, after staining, are examined for growth by fluorescence microscopy, growth being indicated by cord-like masses of acid-fast bacilli. In an attempt to eliminate the preliminary acid treatment of the smeared slides, the addition of 5 units of penicillin and 50 μg. sulphadiazine per ml. has shown some promise. Neither treatment entirely removes contaminants, but they suppress growth sufficiently to make the test practicable.—M. WOODBINE.

DOLD, H. (1947.) Nachweis tuberkellbacillenfeindlicher Stoffe im normalen menschlichen Harn und Untersuchungen über die Natur dieser Stoffe. [**Evidence of growth-inhibitory substances to** *Mycobacterium tuberculosis* **in normal human urine and the examination of the nature of these substances.**]—*Z. Hyg. Infektkr.* **127.** 304–315. [Abst. in *Bull. Hyg., Lond.* **24.** 279. (1949), copied *verbatim.* Signed: HERTA SCHWABACHER.] **27**

The author used a four-week-old culture of *Myco. tuberculosis*: 60 mgm. of wet culture were ground in 0·7 ml. saline. The suspension was transferred to a container holding 2 ml. urine. Control suspensions were transferred into 2 ml. saline. After shaking, treatment with sulphuric acid and centrifugation, the deposit suspended in saline was seeded on to Petragnani's medium. Those cultures shaken with urine, in contrast to the controls, showed little or no growth after 14 days. Two urine-treated cultures after 40 days' incubation were considered to be sterile; the surface cultural washings when inoculated into guinea pigs failed to evoke lesions. [Unfortunately no record is given that the control cultures were submitted to animal inoculation.] The urinary growth-inhibitory substances were not destroyed when urine was held at 56°C. for one hour. The inhibitors were incompletely removed from urine by passage through an $Al(OH)_3$ candle. Individual constituents of urine failed to inhibit the growth of tubercle bacilli. The suggestion is put forward that the presence of urease, either in accompanying organisms or in the tubercle bacillus itself, might cause the production of bactericidal cyanic acid in urine. The author intends to investigate this possibility.

LEVADITI, C., VAISMAN, A., & LÉVY, P. (1949.) Durée de la persistance du B.C.G. dans le poumon, la rate et le foie des souris contaminées

par voie intraveineuse. [**Persistence of BCG in organs of mice infected by the intravenous route.**]—*C. R. Soc. Biol. Paris.* **143.** 357–359. 28

Several groups of mice were given 0·5 ml. of a 10% or 20% suspension of BCG intravenously and killed at varying intervals from 0–219 days. The organism generally persisted in the lungs, liver and spleen for 3–219 days.—G. F. ROBERTS.

HEIMBECK, J. (1948.) Revertorer og standardisert Dansk tuberkulin. [**Revertors—positive reactors who become negative—and standardized Danish tuberculin.**]—*Tidsskr. norske Laegeforen.* **68.** 263–264. [Abst. in *Bull. Hyg., Lond.* **23.** 676. (1948), copied *verbatim*. Signed: CLAUD LILLINGSTON.] 29

Much concern is expressed in Norway at the present time over the quality of the various tuberculins available for controlling BCG vaccinations. In a recent M.D. thesis in Denmark, Dr. Sigrid Holm has startled everyone concerned by the observation that within a year of becoming tuberculin-positive (Mantoux 1 mgm.) 41·6 per cent. of the persons tested again became tuberculin-negative. Heimbeck is openly sceptical over the reliability of this observation, and he quotes it in connection with his preference for non-standardized Norwegian tuberculin *vis à vis* the standardized Danish tuberculin, which seems to be much the weaker of the two. As BCG vaccination hinges from start to finish on tuberculin reactions, the criticism to which they are now exposed in Norway is most disquieting.

SEIBERT, F. B. (1949.) **The isolation of three different proteins and two polysaccharides from tuberculin by alcohol fractionation. Their chemical and biological properties.**—*Amer. Rev. Tuberc.* **59.** 86–101. [English and Spanish summaries, English summary copied *verbatim*.] 30

A preliminary procedure, utilizing fractionation with alcohol at low temperature, has been presented for isolating from raw unheated tuberculin, made by growing different strains of tubercle bacilli on synthetic medium, two different polysaccharides (designated I and II) and three different proteins (designated A, B, and C).

Each of these components, all of which have been isolated several times and from the culture filtrates of different strains of tubercle bacilli, can be identified by its electrophoretic mobility. In the order of increasing mobility they were polysaccharides I and II, proteins A, B, and C.

A component with a still greater mobility, designated as D and possibly a nucleoprotein, was found to exist in significant amount in a five-week-old culture but not in older cultures from the same strain or other strains of tubercle bacilli.

Different strains of tubercle bacilli yielded different relative amounts of the polysaccharide and protein components. The amounts could be predicted from the electrophoretic diagrams of the original concentrated tuberculin filtrates.

Protein A was more potent and possibly more specific than protein C in eliciting the tuberculin skin reaction in infected animals and human beings.

The A and C proteins had similar spectral specific densities in ultraviolet light at a wave length of 2,800 Å, but the C proteins had nearly twice the specific densities at a wavelength of 2,500 Å, giving a density ratio $\left(\frac{\lambda\ 2800}{\lambda\ 2500}\right)$ of about half that for the A proteins. Utilization of this ratio may help in the identification of A and C proteins during a fractionation.

CRIEP, L. H., LEVINE, M. I., & AARON, T. H. (1949.) **Inhibition of the tuberculin type reaction by antihistaminic drugs and rutin.**—*Amer. Rev. Tuberc.* **59.** 701–706. [Authors' conclusions copied *verbatim*.] 31

The tuberculin type of sensitivity reaction is not affected by antihistaminic drugs or by rutin [a crystalline principle obtained from the leaves of common rue, *Ruta graveolens*—Ed. *V. B.*]. Pyribenzamine did not prevent the development of tuberculin sensitivity in guinea pigs infected with tubercle bacilli, although some delay in this development was noted. The oral administration of rutin, another drug which has shown some antianaphylactic activity, failed to inhibit the tuberculin reaction.

MEADE, G. M., & STEENKEN, W., Jr. (1949.) **Viability of tubercle bacilli in embalmed human lung tissue.**—*Amer. Rev. Tuberc.* **59.** 429–437. [Spanish summary. English summary and conclusions copied *verbatim*.] 32

Tubercle bacillus laden lung tissue from 24 anatomy dissection cadavers obtained from schools of medicine was injected into guinea pigs. Some of the injected animals developed positive tuberculin tests at the end of two or three months. No guinea pigs died of tuberculosis and none showed evidence of disease at autopsy three months after inoculation. It is concluded that under the conditions ordinarily prevailing tubercle bacilli are not viable in lungs of embalmed Medical School dissection cadavers at the time of dissection.

LEVI, M. L. (1948.) **Experimental study of Johne's disease in goats.**—*J. comp. Path.* **58.** 38–63. 33

Six experiments are described in which 42 goats, 1–18 months old, were dosed orally 3–4 times over a period of a week with Johne's bacilli in the form of intestinal scrapings from affected

cattle or with 4–7 week cultures of the bacillus on Dunkin's egg medium. Eighteen out of 25 goats, observed for nine months or over following infection, developed clinical symptoms of a progressive and, in many cases, fatal disease very similar to the natural disease of cattle. In successive double-intradermal johnin tests of infected and contact goats it was found that allergy appeared to diminish or disappear as animals became increasingly resistant, whereas most of the goats which died of the experimental disease developed a persistent allergy. The allergic response of the adult goats in one experiment was very irregular. Comparison of avian tuberculin with johnin as a diagnostic agent in experimentally infected goats demonstrated the inferiority of the former.

Johne's bacilli were found to be eliminated in the faeces during the period of incubation as well as during the clinical stages of the experimental disease. While the lesions in experimental goats resembled those observed in cattle, caseous or calcified nodules were observed in the mesenteric lymph nodes of nine out of 18 clinically affected goats. Johne's bacilli were isolated not only from the intestines and associated lymph nodes, but also from other organs.

Pathological examination of the organs of goats killed at intervals after experimental infection suggested that the main portal of entry of the bacillus was the intestine.

Experimental results indicated that goats could be substituted for calves for the further study of Johne's disease.—R. O. Muir.

Johnson, H. W., Larson, A. B., Henley, R. R., & Groth, A. H. (1949.) **Studies on johnin. VI. The relationship of the allergens of *Mycobacterium paratuberculosis*, *Mycobacterium tuberculosis* var. *avium*, *bovis* and *hominis* and *Mycobacterium phlei*.—*Amer. J. vet. Res.* 10.** 138–141. **34**

Fifty cattle were used in a study of the relationship of the potency of different allergens when tested against previous sensitization with acid-fast organisms of different species. Each animal was sensitized by the intraperitoneal injection of 60 ml. of a mineral-oil suspension containing 8 g. of heat-killed moist organisms. The allergens were tested four times in three dilutions, a total of 156 injections per animal. Skin thickness readings were taken before and 48 hours after each injection.

It was found that whilst sensitization due to *Mycobact. johnei* and *M. tuberculosis* var. *avium* must be considered in the interpretation of the tuberculin test, the sensitivity due to *M. phlei* is only of minor importance.—K. B. Sinclair.

Conn, H. J., & Dimmick, I. (1947.) **Soil bacteria similar in morphology to *Mycobacterium* and *Corynebacterium*.—*J. Bact.* 54.** 291–308. [Authors' conclusions copied *verbatim*.] **35**

There has been a tendency within the last ten or fifteen years to place certain soil bacteria and plant parasites in the genera *Mycobacterium* and *Corynebacterium*; this practice seems to have started independently with Krassilnikov and Jensen in 1934.

The present study has made it evident that Krassilnikov's *Mycobacterium* is the same as Jensen's *Corynebacterium* and is not acid-fast. Partially acid-fast organisms, apparently related to *Mycobacterium*, do occur in soil; but as they do not seem to make up part of the predominant soil flora, they have not been included in the present study. Special attention has been given to forms found in local soils that are similar to Jensen's group I of *Corynebacterium* (which showed much morphological variation and which he claims are most closely related to the diphtheria organism). It is clear that among these forms should be included *Bacterium globiforme* Conn. It is also evident that they differ so much from *Corynebacterium diphtheriae* that, although probably related to it, they scarcely belong in the same genus. For this group of species the name *Arthrobacter*, emended from A. Fischer, is here proposed, with *Arthrobacter globiforme* (Conn) *comb. nov.* as the type.

A less intensive study has been made of the plant pathogens that have been placed in *Corynebacterium*. It is concluded that *Corynebacterium michiganense* may well belong in that genus, but the inclusion there of *C. fascians* is questionable; *C. flaccumfaciens* and *C. poinsettiae*, however, should not have been placed in it, chiefly because they are motile, with a single flagellum at one pole.

Kass, A. (1948.) Difteribehandling med serum inneholdende antitoksin og antibakterielle antisoffer. **[Diphtheria treatment with serum containing antitoxin and antibacterial antibodies.]** —*Nordisk Med.* **38.** 1076–1079. [Abst. in *Bull. Hyg., Lond.* **23.** 660. (1948), copied *verbatim*. Signed: D. J. Bauer.] **36**

Diphtheria antiserum is now given in higher doses than originally, and it has been suggested that the old-type antisera were more effective since they contained antibacterial antibodies as well as antitoxin. Recently a combined antitoxic and antibacterial serum (amboserum) has been tried out in America with favourable results, and the author reports a trial of this serum in Norway.

Between 1946 and 1947, 77 cases of diphtheria were treated with amboserum, and 136 cases with ordinary diphtheria antiserum. The results are analysed in a number of tables, showing incidence of complications, duration of hospitalization and

other relevant matters. Although amboserum was quite as effective as ordinary serum in treating the disease, it showed no additional advantages in spite of its content of antibacterial antibodies. The incidence of serum reactions was also somewhat higher.

MacKenzie, E. F. (1947.) **Diphtheria outbreak, Brighton, Vic., 1947. A milk-borne infection.** —*Hlth Bull., Melb.* Jan./June. Nos. 89–90. pp. 2395–2411. [Abst. in *Bull. Hyg., Lond.* **23.** 659. (1948), copied *verbatim*. Signed: R. E. O. Williams.] **37**

The finding of a number of sore throats associated with infection by *C. diphtheriae* (*intermedius* type) among the children at an orphanage, and various evidence that the infection was milk-borne, led to the discovery of a milker with a diphtheritic ulcer of the nose, apparently a sequela of an attack of clinical diphtheria eight years previously. It seemed probable that only one batch of milk was infective, but 35 of the 120 children at risk became bacteriologically infected. Only two had any tonsillar membrane, and none showed signs of toxaemia. The mildness of the disease was presumably due in part to the previous immunization of the children.

Steen, E. (1949.) **Satellitism in a corynebacterium due to an unusual growth factor.**—*Acta path. microbiol. scand.* **26.** 412–417. [In English. Author's summary copied *verbatim*.] **38**

A Corynebacterium, which grows as a satellite around staphylococcus colonies on blood agar, is described. The satellite phenomenon is due to a filterable growth factor which is produced when staphylococci grow in broth containing serum. The growth factor is a protein, probably an albumin, and is not identical with the X or V or other known factors promoting the growth of Corynebacterium.

Sforza, M. (1940.) Epatiti apostematose in bovini Eritrei da bovisepticus. [**Liver diseases in Eritrean cattle caused by** *Pasteurella*.]—*Nuova Vet.* **19.** 51–59. **39**

S. studied the bacteriology, in three infected livers, of a condition encountered in slaughter cattle in Eritrea. There were nodules varying from the size of a pea to that of an orange, superficially and deep in the parenchyma and containing a yellow or greenish white, odourless, greasy pus. *Pasteurella boviseptica* and *Corynebacterium pyogenes* were cultivated from all three livers. Some details are given of a g. pig which died a month after inoculation of pus from one of the livers, of a rabbit which died four days after inoculation of a 24-hour-old culture from the same liver and of a g. pig inoculated with a culture of the *C. pyogenes* from the second liver.

A calf inoculated subcutaneously with 7 ml. of 12-hour-old *Pasteurella* culture from the third liver remained healthy except for a swelling at the site of injection and when killed four weeks later no lesions were found P.M. Another calf, given 7 ml. of the same culture when it was 24 hours old, died after two days. P.M. there were necrotic, haemorrhagic lesions in the peritoneum, spleen, liver, kidneys and lungs. The organisms were recovered from the heart blood. After serial passage in g. pigs, rabbits and calves, the virulence increased. S. considers that a *Pasteurella* strain of low virulence was the cause of the condition. —E. G.

Singh, N. (1948.) **Nasal carriers in bovine pasteurellosis.**—*Indian J. vet. Sci.* **18.** 77–80. **40**

Two hundred live and 100 slaughtered animals, mainly young buffaloes from the United Provinces, were examined for the presence of *Pasteurella septica* by the use of nasal swabs in live animals and also in dead animals. Pasteurella were isolated from 3·5% of the live animals examined and from 7% of those examined P.M. Details are given of studies made on the 15 strains isolated.—P. C. Gangulee.

Yeoman, F. T. (1946.) **Pneumonia in sheep. Use of sulphanilamide.**—*Yearb. Inst. Insp. Stk N.S.W.* 1946. p. 47. **41**

This is a brief report of the successful treatment with sulphanilamide of two young Border Leicester rams which had pneumonia. An initial dose of 15 g. was given, followed by subsequent doses of 5 g. twice daily for six days.—D. F. S.

Rochenmacher, M. (1949.) **Relationship of catalase activity to virulence in** *Pasteurella pestis*. —*Proc. Soc. exp. Biol., N.Y.* **71.** 99–101. [Author's summary copied *verbatim*.] **42**

Optimal conditions for catalase activity in *P. pestis* were determined and the catalase activity of 14 virulent and 11 avirulent strains was measured. The catalase activity of virulent strains was significantly greater than that of the avirulent strains. The possibility of using catalase activity as a screening test for determining virulence *in vitro* has been indicated.

Losiński, T. (1946.) Studia nad nosicielstwem hemofilnej pałeczki Pfeiffera u świń. [*Haemophilus influenzae* **in pigs.**]—*Ann. Univ. M. Curie-Skłod.* Sect. D. 1. 311–333. [English summary.] **43**

Haemophilus influenzae was isolated from the lungs of 14 out of 100 healthy slaughter pigs and from the lungs of five out of 20 pigs with symptoms of swine influenza.

It is stated that pig blood medium is less suitable than horse blood medium for the cultiva-

tion of *H. influenzae*. Some details are given of the cultural characters of the strains grown.—E. G.

MÖLLER, O. (1948.) **Bacterial variation in *Escherichia coli*.**—*Acta path. microbiol. scand.* Suppl. No. 74. pp. 1–84. [In English.] **44**

Although the serology of the *coli* group has been cleared up in its main features serum therapy is still not feasible because of the complication of bacterial variation. As a step towards solving this problem the M (mucoid), S (smooth) and R (rough) variants of twelve *coli* strains were compared culturally and with regard to their pathogenicity. The M variants were more pathogenic for mice than the S or R, were more resistant to phagocytosis and to the bactericidal power of the blood serum. Serologically the M variants contained M- and S-antigen, the S variants only S-antigen and the R variants only R-antigen. All twelve R variants fell into two serologically different groups which had no relation to the M-, S- or H-antigens of the parent strain. The strains belonging to one of these R groups fermented salicin, those of the other did not. Reversion from R to fully virulent M was observed in the presence of serum, but not reversion to S.

—A. MAYR-HARTING.

KINTNER, L. (1949.) **Canine salmonellosis.**—*Vet. Med.* **44.** 396–398. **45**

K. discusses the sources of infection and the incidence of canine salmonellosis reported by many workers in the U.S.A. The majority of outbreaks in dogs and foxes were caused by *Salmonella typhimurium*, *S. cholerae-suis* and *S. enteritidis*. Out of 71 dogs examined in the Ohio State University Veterinary Clinic, a random cross-section of all clinical cases there, 13 were positive for *Salmonella*. Of these, almost 50% had also distemper. Experimental administration *per os* of apparently virulent organisms to dogs failed, however, to cause any illness or produce a chronic carrier. *S. typhi-murium* given intravenously to two dogs produced grave symptoms, but both animals recovered without treatment.—E. F. LEWIS.

WEBB, J. L., & WEBB, A. M. L. (1948.) **A first record of *Brucella abortus* (Bang) in the cattle of Mauritius; and data on the possible occurrence locally of undulant fever in man.**—*J. Hyg., Camb.* **46.** 419–421. [Authors' summary slightly modified.] **46**

Recovery of a strain of *Brucella abortus* Bang from a foetus aborted by a cow in Mauritius is reported. Agglutination tests performed on samples of blood from cows of the Government Dairy indicate that contagious abortion of cattle is present in Mauritius; approximately 24% of the animals from the Government Dairy belonged to the latent or past infection group; 18% to the active infection group and 15% were presumptive bacilli excreters.

As a result of agglutination tests with the blood serum from man undulant fever due to *Br. abortus* is suspected to occur in Mauritius.

CHRISTENSEN, N. O. (1948.) **Studies on the agglutinin formation in brucellar infection of the genitals of the bull.**—*Acta. path. microbiol. scand.* **25.** 202–209. [In English.] **47**

Examination of 16 bulls with *Br. abortus* infection of the genital organs revealed an agreement between the lesions and the agglutinin titres of the corresponding secretions. This titre was usually considerably higher than the corresponding blood or seminal titres. The most common pathological feature was a plasma cell infiltration closely connected with the glandular epithelium and demarcation membranes.—J. I. TAYLOR.

BÜRGISSER, H. (1949.) Nouveaux cas de brucellose chez les lièvres. [**New cases of brucellosis in hares.**]—*Schweiz. Arch. Tierheilk.* **91.** 273–276. **48**

Brucellosis in hares, formerly considered rare in Switzerland, is claimed by B. to be of common occurrence. The lesions are described and the need for bacteriological examination is stressed in order to differentiate brucellosis from *Pasteurella pseudotuberculosis* infection, staphylomycosis and tularaemia. Means by which hares may spread the disease are mentioned.—MARCUS S. BROOKE.

CHASSAGNE, P., & GAIGNOUX, Y. (1948.) Enquête sur les brucelloses. [**An enquiry into *Brucella* infection.**]—*Bull. Inst. Nat. Hyg., Paris.* **3.** 433–444. [Abst. in *Bull. Hyg., Lond.* **24.** 259. (1949), copied *verbatim*. Signed: R. LOVELL.] **49**

The enquiry is based on the records of 603 cases of *Brucella* infection, most of which occurred during 1946. The main conclusions are that males are attacked more frequently than females and that furthermore the disease is more benign in females than in males. There is also a high frequency in adults in spite of the greater consumption of milk by children. Over 90 per cent. of the cases were in the rural areas and here the occupations most often cited are those of men associated with animals, particularly during parturition and abortion, of those who handle manure and of those concerned with the slaughter of animals.

Seven of a total of 603 died, giving a percentage mortality of 1·2. Although it was difficult to determine the period of incubation, there was apparently some variation with a greater frequency in the 15- to 30-day group. The methods of diagnosis included:– blood culture, agglutinin content of the serum and the intradermal injection

of melitin. Twenty-nine of 36 cases were due to *Brucella melitensis* and the remaining seven were caused by *Brucella abortus*. The origins of infection were linked with the geographical distribution of the cases, for the goat was the only animal concerned with the disease in the S.E. Mediterranean zone, whereas in the S.W. and S. of France infection was derived from goats and from sheep; infection from cattle was evenly distributed throughout the country.

The organism entered the body by the skin in most of the cases derived from goats and sheep, whereas the cutaneous route was only slightly more common than the oral route in infections from cattle. This applied to the rural areas, for in the urban districts the oral route was the more frequent and the common vehicle of infection was fresh cheese. It is surprising to note that of 55 urban cases so observed, 17 were infected from human beings, as against 24 of the total 603 from rural and urban areas.

A study such as this should be of value in instituting methods for prevention of *Brucella* infection.

SHIPE, E. L., Jr., & HOLTMAN, D. F. (1948.) **Production of a less sensitive rapid antigen for diagnosis of *Brucella* infections.**—*Proc. Soc. exp. Biol., N.Y.* 68. 546–548. **50**

Sterile collodion membranes were laid over bacto-tryptose agar plates. A 24-hour culture of *Br. abortus* was sown on these and the inverted plates were incubated for 4–5 days at 37°C. After harvesting, the cells were suspended in a glycerin-phenol-saline solution to which was added a suspension of 1 : 25,000 crystal violet and brilliant green. The cells were killed by heat at 60°C. for two hours and the antigen was obtained by filtration.

The antigen thus prepared was markedly less sensitive than the regular rapid antigen [*V. B.* **10.** 648.] at dilutions of 1 : 100 or less, but agreed closely with test tube antigen reactors.—J. I. T.

BUTLER, C. A. (1948.) **The effect of strain 19 on fertility.**—*J. R. Army vet. Cps.* **19.** 37–39. **51**

Vaccination with strain 19 did not cause either temporary or permanent infertility among 66 adult buffaloes.—J. I. TAYLOR.

MCDIARMID, A. (1949.) **A comparison of the immunising value in cattle of dead antigens and S. 19 *Br. abortus* vaccine.**—*Vet. Rec.* **61.** 305–308. **52**

Sixty maiden Ayrshire heifers aged one year and ten months to two years and six months, reared in a brucella-free herd and negative to agglutination tests, were divided into five equal groups, A, B, C, E and F. Group A remained unvaccinated and served as controls. Group B were vaccinated subcutaneously with 5 ml. of strain 19 *Br. abortus* vaccine (approximately equivalent to 60,000 million viable organisms). Group C were vaccinated intradermally with 3 mg. of an antigenic fraction of *Br. abortus* in 0·2 ml. of fluid (also equivalent to 60,000 million organisms). Groups E and F were vaccinated intramuscularly with a suspension of formalin-killed *Br. abortus* suspended in lanolin and liquid paraffin in strengths equivalent to 600,000 million and 60,000 million organisms respectively.

The heifers were mated, 51 subsequently becoming pregnant, of which three were excluded from the experiment for other reasons. During the sixth month of pregnancy the heifers were infected conjunctivally with virulent *Br. abortus*. Agglutination tests were performed on three samples drawn before vaccination and on samples drawn regularly thereafter. At parturition, the organisms were sought in blood, uterine cotyledons, colostrum, and foetal stomach contents both culturally and by inoculation into g. pigs. *Post-partum* milk samples were similarly examined.

It was concluded that, while a satisfactory immunity might be produced by the lanolin vaccine if given in large and repeated doses, the living avirulent strain 19 vaccine was at present much more effective.—G. FULTON ROBERTS.

ANON. (1949.) **"Brucella M vaccine".**—*Iowa Vet.* **20.** 12, 14 & 17. **53**

Subcutaneous injections of live cell suspensions of the mucoid phase of *Br. suis* into 1,100 adult cattle or calves did not produce progressive infection. Of 772 adult animals vaccinated 33 aborted. No controls were used.—J. I. TAYLOR.

FENSTERMACHER, R., SAUTTER, J. H., & POMEROY, B. S. (1949.) **Tularemia in beavers and its transmission to man.**—*N. Amer. Vet.* **30.** 250–255. **54**

The authors discuss the literature on the occurrence of *Brucella tularensis* in the beaver, and report on an investigation into a suspected outbreak. Although they failed to isolate the organism, the histological findings were suggestive. One of the workers later became ill, and blood serum tests indicated an exposure to tularaemia, although cultures were constantly negative.

—K. B. SINCLAIR.

RAJAGOPALAN, V. R. (1948.) **On the use of tissue-free media for the preparation of blackquarter vaccine. (I) Cysteine hydrochloride broth. (II) Acid digest of liver and meat.**—*Indian vet. J.* **24.** 367–381. **55**

I. Growth of *Clostridium chauvoei* was obtained in broth containing a minimum of 0·05% cysteine hydrochloride, and was improved by the

addition of 0·5% glucose. The optimum pH was 6·8 and no growth was observed in a medium more acid than pH 5·6. Sterilization of the medium either by filtration or by heat at 100°–102°C. did not adversely affect the usefulness of the medium. Cysteine hydrochloride broth should be used fresh, but if glucose is also present the medium is usable for up to 24 hours and it can also be regenerated within five days of its preparation by heating for half an hour at 120°C.

Details are given for the preparation of black-leg vaccine.

II. A second tissue-free medium is described. —M. M. SINGH.

GLÄSSER. (1947.) Die Gigasbazilleninfektion des Schafes. [*Clostridium oedematiens* (*gigas*) **infection in sheep—infectious necrotic hepatitis.**]—*Berl. Münch. tierärztl. Wschr.* No. 6. pp. 65–68. **56**

G. gives a general brief account of the disease and of its association with liver fluke infestation. Emphasis is laid on the need to differentiate it from bradsot in which the main lesion is a haemorrhagic inflammation of the abomasum.—L. G. D.

BALDWIN, E. M., FREDERICK, L. D., & RAY, J. D. (1948.) **The control of ovine enterotoxemia by the use of *Clostridium perfringens* type D bacterin.**—*Amer. J. vet. Res.* **9.** 296–303. **57**

Experiments during the winter feeding seasons of 1946 and 1947 are described which demonstrate the efficacy of alum-precipitated *Cl. welchii* type D bacterin in controlling enterotoxaemia losses in lambs in fattening pens. While the 1946 experiment was well controlled, conducted with a minimum of technical work, and yielded encouraging but inconclusive results, the 1947 experiment was subjected to rigidly controlled and critical laboratory conditions, the bacterin used for immunization was five times more potent than that used in 1946 and the dietary constituents were somewhat modified.

At the start of the 1947 experiment, 1,967 lambs were subcutaneously injected just posterior to the axillary space with 5·0 ml. of the bacterin and 960 of them were reinjected with a similar dose a fortnight later. The 1,970 control lambs were derived from the same source as the inoculated group and the daily ration of corn and molasses was maintained at approximately the same level for both groups. During the course of the experiment, 66 control and three immunized lambs died of enterotoxaemia, diagnosis being made by the intravenous inoculation of mice with a filtrate of the intestinal contents and a mixture of the filtrate with an equal volume of standard type D antitoxin after standing for one hour at room temperature.

The antitoxic titre of the blood serum of the inoculated lambs, estimated 30–62 days after the initial injection, indicated that both the single and double dose groups of immunized lambs were resistant to the type D toxin of *Cl. welchii*. Lambs thus immunized could be fed larger quantities of fattening materials than usually fed, with little danger of ovine enterotoxaemia losses.—R. O. M.

LITTMAN, M. L., MCQUOWN, A. L., & SCHNEIDAU, J. D. (1949.) **Recent advances in the culture diagnosis of fungus disease.**—*Amer. J. clin. Path.* **19.** 865–872. [Authors' summary copied *verbatim.*] **58**

A new selective agar culture medium for the primary isolation of pathogenic fungi known as Littman's ox gall agar, was applied to the culture diagnosis of cutaneous and systemic mycoses. Diagnoses of cutaneous mycoses were made 5 to 6 times more frequently with the new medium than with Sabouraud's dextrose agar, while systemic mycoses were detected twice as frequently. The laboratory routine for fungus culture considered most desirable is outlined. The high efficiency of the new medium in detecting pathogenic fungi from clinical material should make it useful to clinical and public health laboratories.

TENENBERG, D. J., & HOWELL, A., Jr. (1948.) **A complement fixation test for histoplasmosis. I. Technic and preliminary results on animal sera.**—*Publ. Hlth Rep., Wash.* **63.** 163–168. **59**

FURCOLOW, M. L., BUNNELL, I. L., & TENENBERG, D. J. (1948.) **A complement fixation test for histoplasmosis. II. Preliminary results with human sera.**—*Ibid.* 169–173. **60**

I. The test, a haemolytic complement fixation test, was essentially the same as the Kolmer test for syphilis, but the antigen here used was histoplasmin. A similar test with blastomycin is also described for the diagnosis of blastomycosis. Both tests were satisfactory for diagnosis in experimentally inoculated g. pigs and, although a cross-immunological relationship was found, fixation was stronger with the homologous antigen.

II. Applied to human patients the test for histoplasmosis gave inconclusive though perhaps useful results.—L. M. MARKSON.

BULLEN, J. J. (1949.) **The yeast-like form of *Cryptococcus farciminosus* (Rivolta): (*Histoplasma farciminosum*).**—*J. Path. Bact.* **61.** 117–120. [Author's discussion copied *verbatim.*] **61**

The presence of a certain concentration of CO_2 in the atmosphere appeared to be essential for the development of the yeast-like form of *C. farciminosus*. Carbon dioxide may also play an important part in the development of the yeast phase of other pathogenic fungi such as *H.*

capsulatum or *B. dermatitidis*. Conant (1941) found that the yeast phase of a strain of *H. capsulatum* could be obtained in sealed but not in unsealed tubes of rabbit-blood agar. Salvin (1947) successfully grew the yeast phase of *H. capsulatum* in a simple semi-solid medium. Both sealed tubes and semi-solid media probably allow a local concentration of CO_2, and it is possible that *H. capsulatum* is more sensitive than *C. farciminosus* to CO_2.

TORRENS, J. A., & WOOD, M. W. W. (1949.) **Streptomycin in the treatment of actinomycosis. Report on three cases.**—*Lancet*. **256**. 1091–1094. [Abst. from authors' summary.] **62**

Treatment with streptomycin caused improvement and arrest or cure of the actinomycosis in all three cases on which it was used. The optimal dosage of streptomycin is not yet known, but the results in these three cases indicate that the course should last three months. The dose for patients of average weight should be 2 g. daily for the first four weeks and then 1 g. daily to a total of twelve weeks. The streptomycin should be given in four divided doses daily for the first two months and may be given twice daily in the last four weeks if improvement is adequate.

LUDWIG, E. H., & HUTCHINSON, W. G. (1949.) **A serological study of selected species of actinomycetes.**—*J. Bact.* **58**. 89–101. [Authors' summary copied *verbatim*.] **63**

Sonic vibrations may be used to produce an antigen suspension from the cells of actinomycetes satisfactory for use in agglutination and precipitin studies on members of this group of microorganisms. The antigen suspensions produced by sonic vibrations may be used successfully, following appropriate inoculation schedules, for the production in mature rabbits of specific immune sera against the actinomycetes. It is probable that the techniques of agglutinin and precipitin reactions may be developed to serve as aids in the identification of, and as a means for demonstrating relationships within, the actinomycetes.

UNGAR, H., & BERNKOPF, H. (1947.) **Bovine leptospirosis.**—*Arch. Path.* **44**. 59–70. **64**

The pathology of bovine leptospirosis was studied in 12 experimentally infected calves. At the time of infection the calves were from 10–14 days old. Six of the calves developed fatal jaundice; two died without having developed jaundice and four had a mild disease. Those which developed fatal jaundice died between the 7th and 11th days after infection. Those which died without jaundice died on the 16th and 21st days respectively. The others recovered and were slaughtered one week after recovery, three of them on the 21st and one on the 59th day.

The lesions observed in the liver, spleen and kidneys are described. In the liver the periportal tissues were chiefly affected; in these there were infiltrations of round cells and the bile ducts frequently contained bile plugs and desquamated epithelium. Necrotic foci, described by other workers, were not a feature of the disease; they were present in some cases, but were considered to have been caused by a concurrent infection with salmonella organisms. In acute cases there was some degree of degeneration of the renal tubular epithelium and interstitial infiltration. The changes in the spleen were negligible. Leptospira were demonstrated in the liver and kidneys of all the calves which died and were also found in the kidney of one calf which had recovered. The lesions are essentially the same as those of Weil's disease in man.—M. C.

BRION, A., & BERTRAND, M. (1947.) Les leptospiroses canines. **[Canine leptospira infections.]** —*Encyclopéd. vét. période*. **4**. 321–335. **65**

The authors describe three syndromes of leptospirosis in dogs, Stuttgart disease or canine typhus, leptospiral jaundice, and leptospiral nephritis, giving also the pathology of each clinical type. The article is written from the clinical viewpoint and although leptospira in general are discussed briefly all that is said about the species as they affect the dog is that *L. icterohaemorrhagiae* causes all the icteric cases and some cases of "typhus" and uraemic cases, and that *L. canicola* causes almost all the Stuttgart type of case and most of the nephritic cases and the "inapparent infections" caused by leptospira. The method of choice for demonstrating them is the inoculation of a g. pig and the inoculation of heart blood into culture medium from the g. pig as soon as the temperature rises. An account of the literature of leptospirosis is given.

Leptospira can be found in the blood and sometimes in the cerebrospinal fluid from the second to the fifth day after infection. Subsequently they become localized in the liver and kidneys. The urine is often virulent, although this may be intermittent. It is suggested that jaundice may be a defence reaction, since *L. icterohaemorrhagiae* is destroyed by bile *in vitro*. Agglutinins develop after 8–15 days.

Diagnosis is discussed. Agglutination reactions up to 1 : 1,000 with ready lysis are considered positive; zone phenomena may occur. Co-agglutinins may be present.

Diagnosis by the inoculation of experimental animals is discussed. For *L. canicola* the dog and the g. pig are the animals that can be used. The authors emphasize that meningitis is produced in dogs inoculated subdurally with *L. canicola* and they point out that natural infection with this

organism may develop into a meningeal syndrome in dogs.

Penicillin is said to act on some of the haemorrhagic acute gastro-enteric and haemorrhagic icteric types of case.—M. R. ORMEROD.

ANON. (1949.) **Canicola fever in Bristol.**—*Lancet.* **257.** 485. **66**

Two cases in a man and wife of *Leptospira canicola* infection with eye complications occurred at Bristol. Infection was probably from dogs and positive agglutination tests have been found in five dogs examined.—M. C.

VAN RIEL, J. (1948.) Conceptions actuelles de la leptospirose. [**Present ideas on leptospirosis.**]—*Brux. Méd.* **28.** 2054–2063. [Abst. in *Bull. Hyg., Lond.* **24.** 34. (1949), copied *verbatim.* Signed: J. C. BROOM.] **67**

The author vigorously attacks the "pluralstic" view of leptospirosis which considers that a. inumber of different *species* of leptospirae exist One of the chief protagonists of pluralism was Schüffner, who used six criteria for the establishment of a species, namely: (1) antigenic properties; (2) pathogenicity for guineapigs; (3) geographical distribution; (4) reservoir host; (5) clinical picture of the disease in man; (6) epidemiology. From his work in the Belgian Congo the author concluded that strains of leptospirae could not be divided into separate species. Groups could be recognized, some identical with known "species", some apparently distinct, some intermediate. It seems to him that leptospirae consist of an antigenic mosaic which defies rigid antigenic classification. The agglutination-lysis and absorption tests are so specific that they exaggerate differences between strains. If the validity of these tests were accepted, new species would constantly have to be added to the genus [a thought which seems to cause the author considerable perturbation.] The complement-fixation test of Carlinfanti gives a group reaction with all the pathogenic leptospirae, and this is thought to indicate the essential unity of all strains.

Criteria 2–5 are held to be so variable that no weight can be placed on them, and scorn is poured on anyone who maintains their value. As for epidemiology, there is only one vital factor—contact with water containing leptospirae—and that is common to all forms of leptospirosis. Reservoir hosts are only of very secondary importance, and it is regretted that so much attention has been wasted on them, and that the fundamental importance of water as a reservoir of infection is insufficiently recognized.

[As the author himself points out, the characters which are used to differentiate species in microbiology are not well established. The methods which are used in zoology are obviously inapplicable. Antigenic analysis (based on agglutination and absorption tests) has proved useful for differentiating bacteria in which the antigenic constitution is stable, though it fails with, for example, trypanosomes, because of their innate variability. According to COLLIER the antigens of leptospirae are well-defined and cannot be altered. In the strains isolated in the Belgian Congo, van Riel found evidence of a considerable degree of serological overlap, but there is no suggestion that the antigenic constitution could be changed. The degree of antigenic distinctness necessary to constitute specific difference is certainly a matter for discussion but not, surely, polemics. Though most workers consider that carrier-hosts must also be taken into consideration, the important part played by contaminated water is well recognized. For instance, in his recent book, VAN THIEL devotes the main part of the chapter on epidemiology to infection by means of water.]

GSELL, O., & WIESMANN, E. (1948.) Leptospirosis Typ Mitis. [**Leptospirosis type *mitis.***]—*Schweiz. med. Wschr.* **78.** 503–506. [Abst. in *Bull. Hyg., Lond.* **23.** 684. (1948), copied *verbatim.* Signed: J. C. BROOM.] **68**

During 1947, 7 cases of meningitis occurred in Switzerland among persons in close contact with pigs. The outstanding symptoms were fever, headache, conjunctivitis, muscle pains and stiffness of the neck. Jaundice was absent in all cases. The urine contained small amounts of albumin, with erythrocytes and casts. The cell content of the cerebrospinal fluid was approximately normal during the first 4–5 days, but increased thereafter to 80–1,600 cells per cmm. Lymphocytes preponderated. The course of the disease was mild and all patients recovered.

The serum in every case agglutinated *Leptospira mitis* to high titre, giving only minor degrees of co-agglutination against *L. pomona*, *L. sejroe* and *L. akiyami.* The author agrees with Johnson (1942, *Med. J. Aust.* **1.** p. 431.) that *L. mitis* is a specific entity. [It is to be noted that *L. mitis*, Johnson differs from *L. mitis*, Mino 1938, which was later shown to be identical with *L. bataviae.*]

FREY, W. (1948.) Benigne Leptospirosen im Kanton Luzern, mit besonderer Berücksichtigung der Differentialdiagnose. [**Benign leptospirosis in the Canton of Lucerne, with special reference to differential diagnosis.**]—*Schweiz. med. Wschr.* **78.** 531–534. [Abst. from abst. in *Bull. Hyg., Lond.* **23.** 684–685. (1948), copied *verbatim.*] **69**

In 2½ years from 1945, 12 cases of benign leptospirosis were seen. The infecting organisms were *Leptospira pomona* (8 cases); *L. grippo-*

typhosa (2); *L. sejroe* (1); *L. mitis* (1). The occupational incidence is stressed as an aid to early diagnosis, for the patients comprised 5 agricultural workers, 2 swineherds, 3 butchers, 1 dairyman, and 1 artisan who kept a pig which was found to be infected with *L. pomona*. The clinical features are similar in the different infections, and so a general description is given.

Incidence is highest in young adults. Incubation period is 7–14 days but may be as short as 2 days.

CERESA, C. (1942.) Sulla spirochetosi dei lavoratori delle risaie nel Novarese. [**Leptospirosis among workers in the rice fields of Novara.**]—*Rass. Med. Indust.* **13.** 421–440. [Abst. in *Bull. Hyg., Lond.* **23.** 684. (1948), copied *verbatim*. Signed: J. C. BROOM.] **70**

Two entirely different forms of leptospirosis occur among workers in rice fields in Italy. One is typical Weil's disease, caused by *Leptospira icterohaemorrhagiae*, and is a serious affection usually accompanied by jaundice. The second type is benign, lasting only 4–8 days, with rapid recovery. Ten cases of this form are described, in 8 of which the diagnosis was made on clinical findings—conjunctival injection, muscular pains, stiffness of the neck, enlargement of the spleen and slight albuminuria. The diagnosis was confirmed in the other two patients whose sera agglutinated *L. icterohaemorrhagiae*, but neither *L. grippo-typhosa* nor *L. pomona*. [It is unfortunate that the causative organism was not determined in the other cases. The suggestion has been made that the anicteric meningeal form of Weil's disease is more frequent when infection is contracted while bathing, the probable route being through the conjunctiva or tonsils. If all these cases, presumably infected *via* the skin, were indeed due to *L. icterohaemorrhagiae* they would provide strong evidence against this thesis.]

See also absts. **97** (equine infectious abortion); **115** (bacteriophage); **154** (streptococcal glycolysis); **161** (bovine haemoglobinuria); **179** (moulds); **209** (bacteria in well water); **211** and **212** (Johne's disease); **236, 237, 239, 240** and **242** (technique); **250** (bacterial nitrogen fixation in whales); **251** and **252** (livestock diseases in Australia); **257** and **258** (textbooks bacteriology).

DISEASES CAUSED BY PROTOZOAN PARASITES

BUXTON, P. A. (1948.) **Trypanosomiasis in Eastern Africa 1947.** pp. 44. London: H.M. Stationery Office. 3s. **71**

B. visited most of the British territories in Africa where trypanosomiasis occurs, during 1945 and 1946. This report is a survey of work that has been done and is in progress in East and Central Africa. It also contains certain suggestions as to further lines which should receive attention.

The author covers all aspects of tsetse and trypanosomiasis research and deals at some length with reclamation. It will be found a most useful review of the subject. Since, as he stresses more than once, trypanosomiasis in these parts of the continent is so much more a veterinary than a medical problem, the report will be of particular interest to veterinarians.

Owing to its wide scope it cannot be abstracted. One paragraph is worthy of quotation, "I am led to the conclusion that we are justified in feeling optimistic. Solid achievements are recorded in several parts of Africa under different conditions: we can now expel *morsitans* and establish men and cattle in certain types of environment though by no means in all. In this respect work of the last twenty years is revolutionary: its importance is not yet realized, even in Africa."

—J. RICHARD HUDSON.

ANON. (1948.) Argentine (République). Acte final de la première conférence internationale pour l'étude de la trypanosomose équine. [**Report of international conference on equine trypanosomiasis.**]—*Bull. Off. internat. Epiz.* **29.** 88–90. **72**

The Conference made a number of recommendations to adjacent countries, including the following:– Research stations for the study of the disease should be erected, the results to be published and circulated. Contaminated zones should be delimited by prophylactic and police measures. *Diptera* and other blood sucking insects should be studied, insectaria set up and investigations made into the role of domesticated and wild animals.

Research techniques should be co-ordinated. A liaison officer should be appointed in each of the adjacent countries in order to ensure co-operation in the control of equine trypanosomiasis, and periodic meetings to review work on the disease and to plan for the future would be advantageous.—JAS. G. O'SULLIVAN.

HORNBY, H. E. (1949.) **The development of our knowledge of animal trypanosomiases.**—*Vet. Rec.* **61.** 375–380. **73**

This address to the Tanganyika Territory Division of the National Veterinary Medical Association gives an interesting, concise and lucid historical account of the development of our knowledge of the genus *Trypanosoma* and of the disease trypanosomiasis especially in respect of aetiology, treatment and pathology.—S. BRIAN KENDALL.

BELL, F. R., & JONES, E. R. (1946.) **Carbohydrate metabolism in bovine trypanosomiasis.**—*Ann. trop. Med. Parasit.* **40.** 199–208. **74**

Twenty-two survivors from a group of 26

zebu cattle infected seven months previously with *Trypanosoma congolense*, were examined. The animals were recovering well from the anaemic crisis, although trypanosomes were still present in most cases. Resting blood sugar was found to be higher than normal and a considerably decreased glucose tolerance with glycosuria was noted. Carbon dioxide capacity of the blood was normal, but chloride values were low.—P. HERBERT.

DOMANSKÝ, F. (1949.) Příspěvek k hřebčí nákaze. [*Trypanosoma equiperdum* **infection in Czechoslovakia.**]—*Čas. československ. Vet.* **4.** 177–189. [English and Russian summaries.] **75**

The history of *T. equiperdum* infection in Czechoslovakia is discussed briefly.

Series of experiments were carried out over a period of two years on 17 infected and on three healthy horses. It was found that the acute stage may be followed by a latent form. The length of the incubation period varied and in some cases lasted up to 12 months. D. regards diagnosis by complement fixation and the Fulton test as unreliable and advocates microscopic examination of vaginal smears.

In the diagnosis of chronic cases, experimental intratesticular inoculation of male rabbits with 1 ml. of a suspension containing suspected tissue in physiological saline gave good results.

Attempts to cultivate trypanosomes in liquid or solid media failed. On blood agar the parasites lived for about seven days. In the chorioallantois of chick embryos multiplication of the parasites was observed. D. did not succeed in demonstrating trypanosomes in the blood of naturally infected horses.

Pathogenicity and virulence of various strains is discussed and the results of serological tests and temperature charts are given in tables.—E. G.

DOMANSKY. (1948.) La réaction de déviation du complément dans la dourine. [**Complement fixation in diagnosis of dourine.**]—*Bull. Off. internat. Epiz.* **29.** 7–11. **76**

A haemolytic complement fixation test using an aqueous extract or a nucleoprotein fraction of the parasite. The two were equally efficacious when fresh, but the latter was more stable. Using as antigen the nucleoprotein fraction, 89% of the results were positive. The lipoid substances in an alcoholic extract hindered the reaction with this antigen and gave slightly less satisfactory results. The efficiency of the test was halved when the disease was of long standing, *i.e.*, 9–12 months after infection.—L. M. MARKSON.

WILSON, S. G. (1949.) **Treatment of *T. simiae* infections with " antrycide ".**—*Vet. Rec.* **61.** 397–398. **77**

Trypanosoma simiae infections are rapidly fatal in domestic pigs and dimidium bromide is ineffective. W. describes the successful treatment of three subcutaneously infected pigs with antrycide sulphate, using single doses of 3, 4 and 5 mg. per kg. Trypanosomes were present after 24 hours but not after 48 hours and recovery was uneventful.

One pig was unsuccessfully treated with antrycide chloride at 2 mg. per kg.; further treatment, 12 days later, with 5 mg. per kg. of the quicker-acting antrycide sulphate had little effect on the trypanosomes. Treatment with 2 mg. per kg. dimidium bromide four days later was also unsuccessful and the pig died the following day. Infected blood from this pig on injection into a healthy pig gave rise to infection which was also resistant to antrycide sulphate treatment.

Young pigs, treated prophylactically with 1, 1·5 or 2 g. antrycide chloride, and exposed to the *Glossina fuscipleuris* fly-belt, were still healthy seven weeks after exposure and 25 weeks after receiving the drug.—MALCOLM WOODBINE.

HORNBY, H. E. (1949.) **Electrical charge of trypanosomes.** [**Correspondence.**]—*Trans. R. Soc. trop. Med. Hyg.* **42.** 626–628. **78**

In an article entitled " A New Approach to Trypanosomiasis " FAIRBAIRN *et al.* [see *V. B.* **19.** 92.] queried a number of contentions. H. deals with their statement that the distribution of trypanosomes in a very thin blood film is related to their electrical charge; positively charged parasites being in contact with erythrocytes, while negatively charged ones are repelled from, and do not touch the red cells. When such matters as the shortness of time required for making a thin blood film and the mechanical forces to which the blood ingredients are subjected when the blood is spread are taken into account, H. considered it strange that trypanosomes which are not adherent to the red cells in the circulating blood should within a second or two of release from the circulation and under conditions of violent mechanical disturbance be capable of orientating themselves independently of this disturbance. He tried to confirm the contention of Fairbairn *et al.* and having failed to do so asks about the findings of other observers. H. used the Tinde strain of *T. rhodesiense* maintained at Mpwapwa in g. pigs. No cyclical transmissions had taken place for more than a year and the parasites showed normal variations in morphology and electrical charge. It was simple to select animals in which a great predominance of their numerous trypanosomes carried a charge of one sign. Much material was available and thin smears were made from animals in which the trypanosomes were predominantly negatively or positively charged. Comparisons of smears were made. No disagreement existed

between observers in regard to the nature of the charge on trypanosomes suspended in glucose-saline but no agreement existed between observers who used the method of Fairbairn *et al.* The positions of the trypanosomes in thin films are considered by H. to be governed entirely by the action of the glass spreader; the closer together the elements of the blood, the more likely are the trypanosomes to touch the cells and if the red cells are widely scattered, the more likely are the trypanosomes to lie detached from all other cellular elements.—C. Horton Smith.

Strugger, S. (1947.) Der fluoreszenzmikroskopische Nachweis von Trypanosomen im Blute. **[Fluorescence-microscope used for diagnosis of trypanosomes in the blood.]**—*Dtsch. tierärztl. Wschr.* **54.** 161–162. **79**

If blood is stained with acridine orange suspended in physiological saline solution the white blood corpuscles appear a vivid green under the fluorescence-microscope. Trypanosomes are easily detected because of the reduced visibility of the red blood corpuscles and because they immediately store the dye in their protoblasts. Cytoplasm, nucleus, flagellum and blepharoblast are easily differentiated and the motility of the parasites is preserved.

The importance of this method in the early diagnosis of *Trypanosoma* infection is emphasized. —E. G.

Bartlett, D. E. (1946.) **Experimental treatment of Trichomonas foetus infection in bulls.** —*Amer. J. vet. Res.* **7.** 417–431. **80**

The treatment of bovine trichomoniasis presents a complex picture: infection in the cow is self-curing provided that further mating is dispensed with; in the bull, however, infection is seldom self-curing and successful therapy without damage to the tissues is a major task.

B. discusses in some detail the literature relating to the treatment of the bull and describes his own experimental procedure, particularly in reference to the estimation of iodine from the prepuce, following oral or intravenous administration of iodine compounds. Potassium iodide was given *per os* in doses of 10 g. per 1,000 lb. body weight daily. Sodium iodide was given intravenously, three to five large doses, 30 g. per 100 lb. at three-day intervals. Iodine in the form of these two salts is only slightly trichomonacidal and is not immediately toxic to *Tr. foetus*. One cow treated by these methods, although excreting iodine, still harboured viable and active trichomonads. Results obtained in bulls were approximately 50% cured by the iodine methods after being subjected to vigorous tests for the presence of *Tr. foetus*. B. failed to obtain any cures using the commonly applied remedies.—W. R. Kerr.

Teeter, K. G., & Ervin, E. F. (1949.) **A method of staining *Trichomonas foetus* in smears of bovine vaginal secretions.**—*Proc. helminth. Soc. Wash.* **16.** 31–35. **81**

An iron-haematoxylin method of staining *Tr. foetus* is described. Stained smears, however, are not recommended as a routine diagnostic method. —G. M. Urquhart.

Mohteda, S. N. (1946.) **Trichomoniasis in a fowl.**—*Indian J. vet. Sci.* **16.** 254–255. **82**

M. described the occurrence of Trichomonas in an indigenous pullet in India for the first time, discussing the symptoms, P.M. lesions and the morphology of the flagellate. Treatment and control measures as suggested by foreign workers were advocated. Emphasis was laid on the need for investigation of the extent of infection. —C. M. Sen Gupta.

Farmer, R. K., & Stephenson, J. (1949.) **Infectious enterohepatitis (blackhead) in turkeys: a comparative study of methods of infection.** —*J. comp. Path.* **59.** 119–126. **83**

The authors compare various methods used for the experimental infection of turkeys with blackhead disease. After consideration of the methods used by previous workers three sets of experiments were carried out to determine (a) the incidence of blackhead produced by running turkey poults on infected ground, (b) the effect of infecting turkeys with rectal injections of cultures of *Histomonas meleagridis* and (3) the effect of inoculating diseased tissue into turkeys. This last method showed by far the most success and the following procedure is recommended. The experimental birds should be young turkeys 4-6 weeks old. An infected turkey is killed, the caecum removed, ground and suspended in Ringer's solution and 2·5 ml. of this suspension is injected rectally into each bird after an enema of 5 ml. of Ringer's solution. The injection should be repeated after an interval of two hours. Experimental birds die 9–14 days after infection. —S. Brian Kendall.

Harwood, P. D., & Stunz, D. I. (1949.) **Nitrofurazone in the medication of avian coccidiosis.** —*J. Parasit.* **35.** 175–182. **84**

Nitrofurazone (5-nitro-2-furaldehyde semicarbazone) in small quantities, *i.e.*, one part of nitrofurazone to 9,000 parts of an all-mash feed, is effective in controlling losses in experimentally induced caecal coccidiosis; at this level the drug did not interfere with the development of immunity and there was no indication of retardation of growth. Nitrofurazone is not effective when dissolved in water and placed in metal troughs. Paraffined troughs prevent deterioration of the drug. Nitrofurazone is administered at 77 hours

after infection. In regard to the time of treatment in relation to the date of infection nitrofurazone is more satisfactory than sulphur and the arsonic acids, is as satisfactory as sulphaguanidine, but less satisfactory than sulphamethazine. Three days of dosing may be adequate for effective control. The ratio between the effective daily dose and the median lethal dose is approximately 1 : 10 and therefore approximates to the similar ratio for the more effective sulphonamides.—C. H. S.

Bovet, D., Décourt, P., Schneider, J., & Montezin, G. (1948.) Activité dans le paludisme aviaire de quelques dérivés synthétiques récemment introduits en thérapeutique : nivaquine, nivaquine B, paludrine et metachloridine. [**Activity in avian malaria of some recently introduced synthetic derivatives of nivaquine, nivaquine B, paludrine and metachloridine.**]—*Bull. Soc. Path. exot.* **41.** 268–274. **85**

The value of conducting experimental chemotherapy on various parasites simultaneously was demonstrated. In tests with *Plasmodium relictum* and *Pl. gallinaceum* the latter was the more sensitive to drugs and metachloridine [*m*-aminobenzene - sulphamido - 2 - chloro - 5 - pyrimidine] proved to be superior to any drug so far used. A drug was considered to be effective if parasites did not appear within three days after their appearance in the blood of controls. Paludrine was moderately active in canaries but it was very toxic to small laboratory animals. Nivaquine and nivaquine B [each a quinoline derivative] proved to be comparable with quinacrine.—G. V. L.

See also abst. **243** (staining).

DISEASES CAUSED BY VIRUSES AND RICKETTSIA

Sabban, M. S. El. (1949.) **Cultivation of pseudorabies [Aujeszky's disease] virus in the yolk sac of the developing chick embryo** —*Proc. Soc. exp. Biol., N.Y.* **71.** 423–429. **86**

Using the yolk sac method, the author cultivated a Hungarian strain of Aujeszky's disease virus in eggs for 50 serial passages. With continued transfer, embryos died 40 hours after inoculation. In the first passage only 60% died after three days. Continued passage also altered the effect of the virus on rabbits, g. pigs, and mice, in that the period from inoculation to death was lengthened.—W. R. Bett.

Jervis, G. A., Burkhart, R. L., & Koprowski, H. (1949.) **Demyelinating encephalomyelitis in the dog associated with antirabies vaccination.** —*Amer. J. Hyg.* **50.** 14–26. [Authors' summary copied *verbatim.*] **87**

Four canine cases of " neuroparalytic accidents " associated with antirabies vaccination are reported, and clinical, laboratory and pathological data given. The pathological features, which are those of a multiple disseminated encephalomyelitis of the demyelinating type, are reported in detail. The possible etiological factors involved are discussed, and the similarity of this condition to other demyelinating processes occurring in canine and in human cases is indicated.

Lanni, F., & Beard, J. W. (1949.) **Interaction of swine influenza virus and egg-white inhibitor of virus hemagglutinins.**—*Proc. Soc. exp. Biol., N.Y.* **71.** 116–117. **88**

The residual inhibitory activity of purified egg-white inhibitor after incubation with purified swine influenza virus for periods up to 100 min. at 27°C. was titrated against swine influenza virus. The results indicated that virus-treated inhibitor was a weak inhibitor as compared with untreated inhibitor. It is suggested that this weak inhibitor is either present as such in a heterogenous inhibitor population and is made manifest by a preferential action of the virus against strong inhibitor, or it is a product of a progressive rather than an all-or-none action of the virus. This latter explanation lends some support to the enzymatic hypothesis of inactivation of inhibitor (substrate) by virus (enzyme).—H. H. Skinner.

Löfström, G. (1949.) **Comparison between two Swedish influenza virus strains and virus A strain PR 8.**—*Acta med. scand.* **133.** 162–170. [In English. Author's summary copied *verbatim.*] **89**

The A 128 and G-g strains of the influenza virus A which were isolated in Sweden during the influenza epidemics of 1944 and 1947 respectively have been compared with the virus-A strain PR 8. There are considerable antigenic differences between the Swedish strains and PR 8, whereas the Swedish strains exhibit a fairly close antigenic resemblance. Serological investigations of cases from the epidemic of influenza A in 1947 afford evidence that the complement-fixation reaction can very well be used in making a sero-diagnosis of influenza in the case of adult patients, although the actual epidemic may be caused by a heterologous A virus. In regard to children, it is more important to use homologous strain for this purpose. A serological investigation of sera derived from persons who have been vaccinated against influenza shows that a good increase in antibodies is obtained against strains included in the vaccine, but not against the heterologous strain that caused the epidemic.

LÖFSTRÖM, G., & OKER-BLOM, N. (1949.) **Comparison between an American, a Dutch and a Swedish strain of influenza virus A isolated in 1947.**—*Acta med. scand.* **134.** 232–234. [In English. Authors' summary copied *verbatim.*] **90**

No antigenic differences could be found between the influenza virus A strains FM1, G-g and Leiden, which were isolated during the epidemic season of 1947 in U.S.A., Sweden and Holland respectively.

HENLE, W. (1949.) **Studies on host-virus interactions in the chick embryo-influenza virus system. I. Adsorption and recovery of seed virus. II. The propagation of virus in conjunction with the host cells.**—*J. exp. Med.* **90.** 1–11; & 13–22. [Author's summaries copied *verbatim.*] **91**

HENLE, W., & HENLE, G. (1949.) **Studies on host-virus interactions in the chick embryo-influenza virus system. III. Development of infectivity, hemagglutination, and complement fixation activities during the first infectious cycle.**—*Ibid.* 23-27. [Authors' summary copied *verbatim.*] **92**

I. Upon injection of active influenza A or B virus into the allantoic cavity of the developing chick embryo, an average of only 70 per cent of the agent was adsorbed onto the tissue, as measured by the difference between the quantity of virus injected and that found free in the allantoic fluid of the injected eggs during the constant period. The degree of adsorption was similar, regardless of whether 10^9 or $10^2 ID_{50}$ of active virus was injected.

Attempts to demonstrate the adsorbed virus in suspensions of the infected tissue met with partial success only in that not more than 1 to 5 per cent of the amount calculated to be adsorbed was actually found. All efforts to increase the yield of virus have failed. These results led to the suggestion that the seed virus, which participates in the propagation, becomes altered in such a way that it no longer may be demonstrated by infectivity titrations, whereas the active virus found represents superficially adsorbed virus, which does not multiply.

II. Experiments have been reported on the propagation of influenza viruses in the allantoic membrane of the developing chick embryo during the first infectious cycle. After adsorption of the seed virus onto the host cells, only a small percentage of it remains demonstrable by infectivity titrations. This amount remains constant for 4 hours in the case of infection with PR 8 virus, and for 6 hours in that of infection with Lee virus. Thereafter, a sharp rise in infectivity occurs 2 to 3 hours before liberation of the new generations of active virus into the allantoic fluid can be detected.

Injection of homologous virus, inactivated by ultraviolet irradiation, following infection prevents or delays the production of virus in the tissues, depending to some extent upon the number of ID_{50} of active virus used as inoculum. The smaller the dose, the more pronounced the inhibitory effect. With increasing delay in the injection of the inhibitor, progressively more virus is produced and liberated 6 and 9 hours after infection with PR8 and Lee virus, respectively. Thus, production of virus may be interrupted by the homologous inhibitor when given up to 3 hours after infection with PR8, and up to $4\frac{1}{2}$ hours after infection with Lee virus. Since no increase in infectivity can be detected during these 3 and $4\frac{1}{2}$ hour periods in the tissues, it is suggested that influenza virus propagates in at least two major stages: first, non-infectious, immature virus material is produced which, subsequently, is converted into the fully active agent. Presumably the first step can be interrupted by the homologous inhibitor, while the second cannot. Heterologous irradiated virus, injected after infection of the tissue, exerts only a slight inhibitory effect on the production of virus.

III. In agreement with earlier observations the infectivity titer in the allantoic fluids of chick embryos injected with influenza A virus remains constant for 5 to 6 hours before an increase in this activity can be noted. In contrast, the titers of hemagglutinin and complement-fixing antigen (virus antigen) have already begun to rise after 3 hours. The origin of the hemagglutinating and complement-fixing but non-infectious material is still obscure.

In the allantoic membrane development of both the soluble and virus antigens can be demonstrated after the 2nd hour of incubation and 1 hour prior to an increase in hemagglutinins and 2 hours prior to a rise in infectivity. Thus there remain the first 2 hours during which no record of virus activity in the tissues can be obtained. Similar relationships are noted on dilution of the seed both in the allantoic fluids and membranes as long as the various properties reach measurable levels during the experimental period of one infectious cycle.

Injection of high titered immune serum following infection with about $10^9 ID_{50}$ reduces the amount of demonstrable seed virus in the allantoic fluid and membrane without significantly affecting propagation of the agent in the tissues as measured by infectivity titrations. The production of hemagglutinins appears markedly reduced under these conditions whereas formation of complement-fixing antigen is only slightly delayed

and decreased. No definite explanations for the various discrepancies between the infectivity and hemagglutination can be given at present.

BURNS, K. F., TIGERTT, W. D., & MATUMOTO, M. (1949.) **Japanese equine encephalomyelitis : 1947 epizootic. II. Serological and etiological studies.**—*Amer. J. Hyg.* **50.** 27–45. [Authors' summary copied *verbatim.*] **93**

Results of laboratory investigations on the epizootic of Japanese equine encephalomyelitis in 1947 have been described. Two strains of a neurotropic virus were isolated in mice from brain tissue of horses with encephalitis. These are immunologically similar to, and probably identical with, the virus (Nakayama strain) of Japanese B encephalitis of human beings.

Neutralization and complement fixation tests on sera of encephalitic and normal horses in epizootic areas indicate the development of antibodies for Japanese B virus. Dissemination of virus among equines was extensive during a period of very low incidence of clinical disease among human beings, and with no demonstrable dissemination among chickens.

HAMMON, W. McD., TIGERTT, W. D., SATHER, G., & SCHENKER, H. (1949.) **Isolations of Japanese B encephalitis virus from naturally infected *Culex tritaeniorhynchus* collected in Japan.**—*Amer. J. Hyg.* **50.** 51–56. [Authors' summary and conclusions slightly amended.] **94**

Several isolations of Japanese B encephalitis virus have been made from naturally infected mosquitoes from Japan. The isolations were made from *C. tritaeniorhynchus* collected just prior to the onset of a moderate-sized outbreak of encephalitis near Okayama in 1948. The mosquitoes were tested in the United States under conditions which render the possibility of virus contamination from other sources extremely unlikely.

SCHLESINGER, R. W. (1949.) **The mechanism of active cerebral immunity to equine encephalomyelitis virus. I. Influence of the rate of viral multiplication. II. The local antigenic booster effect of the challenge inoculum.**—*J. exp. Med.* **89.** 491–505; & 507–527. [Author's summaries copied *verbatim.*] **95**

I. Continued serial brain-to-brain passage of strains of W.E.E. virus in mice has yielded variants which kill mice with increased rapidity. Their rate of multiplication in the mouse brain has been found to be correspondingly increased. At 1 hour after intracerebral inoculation of various amounts of W.E.E. virus, only 3·5 to 10 per cent of the expected amount of virus was recovered from the infected brains. In infected mouse brains, the period of active viral multiplication was preceded by a latent phase which lasted a considerably shorter time in the case of a " fast " than in that of a " slow " variant. In brains inoculated with various amounts in excess of minimal lethal doses the rates of multiplication tended to converge with the result that the maximum titer was reached after about the same period of time. After inoculation of smaller amounts, the rates of viral multiplication tended to parallel each other.

Vaccinated mice may be fully resistant to maximal intracerebral doses of a slowly multiplying strain while they are not at all or only partly protected against a rapidly multiplying one derived from it. This difference is demonstrable even though fast and slow variants are, as far as can be tested, serologically identical. The difference in response may be masked if animals are immunized with relatively large doses of vaccine. The bearing of these findings on certain practical problems has been pointed out.

II. The fate of W.E.E. virus has been followed in the brains of mice vaccinated to such an extent that they failed to resist a large intracerebral challenge dose of a viral variant with a rapid rate of multiplication but were fully protected against a similar amount of a " slow " strain. The growth rate of the " fast " variant in vaccinated animals paralleled that in non-vaccinated ones at a slightly lower level. The " slow " strain also multiplied, but its rate of growth was depressed. Nevertheless, it persisted for 4 days at a level 100-fold higher than its initial titer. After the 4th day the virus was no longer demonstrable and was replaced by neutralizing antibody which rose so high that the serum antibody/brain antibody ratio was reduced from a " physiological " value of about 200/1 to less than 10/1. Antibody persisted in brain tissue in high titer until at least 127 days after challenge inoculation. The shift in the serum/brain ratio of neutralizing antibody was paralleled by a similar shift in the ratio of complement-fixing antibody. The neutralizing antibody in brain tissue, like that in serum, followed the " percentage law " on dilution of underneutralized mixtures.

In mice immunized with small doses of vaccine, the intracerebral challenge inoculum induced a significantly greater local immune response than in those immunized to a higher degree. Mice with very low grade immunity were found more resistant to large amounts of virus than to small amounts. This " paradoxical " response to challenge was explained as due to the antigenic booster effect exerted by amounts of virus in excess of that utilized to initiate infection which were present in large inocula but absent in small doses. The broader relation of these findings

to the problem of antiviral immunity has been discussed.

NIŽNÁNSKY, F. (1949.) Infekčná anémia koní v ČSR. [**Infectious anaemia in horses in Czechoslovakia.**]—*Čas. československ. Vet.* **4.** 321–334. **96**

N. discusses the incidence of equine infectious anaemia in various districts of Slovakia during the years 1939–48. The disease was introduced by German occupation forces and reached its peak in 1942, when 158 deaths occurred in 68 communities. In the last ten years the disease was demonstrated in 533 horses. During that period all infected and suspected horses were examined haematologically during the febrile stage of the disease. Horses with less than five millions of erythrocytes were regarded as infected, subject to histological and P.M. confirmation. The number of leucocytes was more or less constant. N. regards the erythrocyte sedimentation test as the most satisfactory means of diagnosis. Examination of faeces was found to be of no diagnostic value.

N. set up the disease experimentally in two healthy horses, which he inoculated with 20 ml. and 100 ml. of serum mixture from several horses affected with a latent form of infectious anaemia. The first fever attack was observed after 17 and 13 days respectively.

A table gives the incidence of the disease in 256 Slovak communities during 1939–48. Bibliographical references are given.—E. G.

PARNAS, J., KUNICKI-GOLDFINGER, W., & STEPKOWSKI, S. (1949.) Spostrzeżenia nad zakaźnym ronieniem klaczy w Polsce. [**Infectious abortion in mares in Poland.**]—*Ann. Univ. M. Curie-Skłod.* Sect. DD. **4.** pp. 217–272. [English summary.] **97**

The various types of infectious abortion in Poland, their aetiology, methods of diagnosis, treatment and prophylaxis are described in general. The relationship between abortion and nutrition and the significance of the blood factors for foetus and foal are discussed.

In 1947–48, 24 of 112 mares on two stud farms aborted and 18 gave birth to dead foals. Agglutination tests for brucella and salmonella organisms and bacteriological examination of the foetuses yielded negative results. Nutritional causes were dismissed. The mares appeared normal before and after abortion. In the foetuses, subepicardial haemorrhages, excessive amounts of intrathoracic and intra-abdominal fluid, enlargement and in some cases focal necrosis in the liver were observed. Pregnant rabbits aborted after inoculation with a filtered suspension of tissue from aborted foetuses and no bacteria could be demonstrated in the rabbit foetuses. Some details are given of attempts to immunize mares by the use of a vaccine prepared from a suspension of organs of affected foetuses, but the results of this measure were not available.

In two other stud farms *Streptococcus genitalium*, *Str. zooepidemicus*, *Str. pyogenes animalis*, and *Str. equi* were isolated from foetuses and from foals which had died shortly after birth. *Salmonella abortus-equi* and the bovine type of *Brucella abortus* were excluded by bacteriological and serological examination. Some details are given of attempts to immunize mares with a mixture of all the different kinds of streptococci enumerated, but no results were available.—E. G.

HADDOW, J. R., & IDNANI, J. A. (1946.) **Goat dermatitis: a new virus disease of goats in India.**—*Indian J. vet. Sci.* **16.** 181–184. **98**

An acute fatal virus disease of goats which was often confused with goat-pox is described. The onset, after an incubation period of 7–10 days, is characterized by fever and rough staring coat followed by small circular elevated nodular eruptions on the skin, lips, eyelids and tongue. More or less simultaneously, symptoms of pneumonia supervene and the animals die. At no stage of development of lesions was vesiculation or pustule formation observed. On P.M. examination greyish white nodules were seen in the lungs, abomasum and intestines. The disease was easily set up by subinoculation of blood at the height of temperature and by intravenous inoculation or scarification of a suspension of the nodules. As a prophylactic measure the authors suggest light scarification on the inside of the ear with the virus.
—C. SEETHARAMAN.

BUFF, V. (1948.) Peste suina. (Aspectos no Brasil. Contribuição bibliográfica.) [**Swine fever. (Some aspects of the disease in Brazil and bibliographical references.)**]—*Rev. Fac. Med. vet. S. Paulo.* **3.** 313–326. [English summary.] **99**

This work contains a history of swine fever in Brazil, and a collection of international references from 1936–46.—G. P. MARSHALL.

ŠNOBL, A. (1948.) Nakažlivá obrna vepřů. [**Teschen disease.**]—*Čas. československ. Vet.* **3.** 598–602. **100**

The author describes the symptoms of Teschen disease and its various forms. He compares the general symptoms with those of swine erysipelas which he believes to be caused by a related agent. The fact that protective inoculation against erysipelas partly immunizes pigs against Teschen disease would seem to confirm his findings.

Fifteen pigs, nine of which had been inoculated against swine erysipelas, were given internal

organs from pigs infected with Teschen disease mixed with their food at a dosage of 100 g. per pig. Their bodies and sties were smeared with infected blood from diseased pigs. Five weeks later one developed signs of erysipelas. The histological test for Teschen disease was positive. The remaining pigs were in good health.

In the second series of experiments two pigs were injected intranasally and two others subcutaneously with 20 ml. of urine from pigs with Teschen disease. One of each group had to be killed on account of erysipelas after 32 and 100 hours respectively. A veterinary laboratory confirmed erysipelas and excluded Teschen disease. The remaining two pigs were inoculated against swine erysipelas and developed no signs of infection.

In the third experiment on four pigs which were injected subcutaneously with a 10–20 ml. dose of a positive brain suspension, temperatures of 1°C. above normal were recorded and inappetence observed. They recovered after ten hours.

The author's experiments were interrupted because of interdiction from the Czech Ministry of Public Health.—E. G.

I. Bachl, A. (1948.) Bisherige Erfahrungen mit Staupevakzine nach Professor Dr. Kress. [**Results obtained with the Kress distemper vaccine.**]—*Wien tierärztl. Mschr.* **35.** 385–386. **101**

II. Ganster, O. (1949.) Die bisherigen Erfahrungen mit der Staupe-Vakzine nach Prof. Dr. Kress. Eine Entgegung zu den Erfahrungen Dr. A. Bachls. [**The canine distemper vaccine described by Kress. An answer to Dr. A. Bachl.**]—*Ibid.* **36.** 198–200. **102**

I. B. states that 27 dogs given three weekly subcutaneous injections of the distemper vaccine prepared by Kress acquired immunity.

II. G. vaccinated 126 dogs with distemper vaccine described by Kress. He states that about 30% developed abscesses at the site of inoculation. In seven other dogs the results were bad; one died and the remaining six could not be used for breeding because of ill-effects that resulted. In another instance a dog died from gas oedema 24 hours after inoculation. G. stated that in most cases the vaccine did not produce immunity, but a form of protracted distemper which was sometimes overlooked. He referred to the use of a sulphonamide in the treatment of enteritis accompanying distemper.—E. G.

Pavilanis, V. (1949.) Neutralisation du virus de la leucopénie des chats *in vitro* et *in vivo*. [**Neutralization *in vitro* and *in vivo* of the virus of feline leucopenia.**]—*Ann. Inst. Pasteur.* **76.** 278–280. **103**

The serum of cats, hyperimmunized against infective leucopenia, contains antibodies which neutralize the virus *in vitro* and *in vivo*, even in weak dilution of 10^{-2}. The hyperleucocytic and leucopenic forms of infective feline leucopenia are immunologically identical.—W. R. Bett.

Generoso, J. D., & Agustin, F. S. (1947.) **Some studies on avian pest immunization. A preliminary report.**—*Philipp. J. anim. Indust.* **9.** 75–88. **104**

Chick embryo-cultured virus maintained for almost a year of continuous passage was used at first, and later a newly isolated virus was similarly cultured.

The virus was diluted with neutral saline so that when mixed with an oily material such as coconut, olive, castor or linseed oils, one M.L.D. of virus was contained in one dose of vaccine. It was observed that the viscosity of the oil was inversely proportional to the severity of the post-vaccinal reaction, so castor and camphorated oils were preferred in later trials. Saponified vaccines produced a lesser degree of post-vaccinal reaction than albumin vaccines. Using various vaccines survival percentages were: albumin vaccine 33%, saponified vaccine 48%, and the lipo-vaccines 20%, as against 8·3% in the controls.

Saponified virus and lipo-vaccines were treated with varying proportions of formalin, and a decided improvement was obtained in the results. Formol-saponified vaccine gave 66% survival, formol-castor oil 77%, and formol-camphorated oil 50%.

Fowls vaccinated with either saponified or lipo-vaccines were inoculated with a small amount of active virus 16–30 days later, and the few flocks thus treated were solidly immune. A more extensive trial is warranted to determine how to attain a safe reaction with the production of immunity.—J. O. L. King.

Fortner, J., & Dinter, Z. (1946.) Einige Untersuchungen über die Hühnerpest. [**Research on fowl plague (Newcastle disease).**]—*Berl. Münch. tierärztl. Wschr.* No. 4. pp. 37–44. **105**

The virus of Newcastle disease was demonstrated in frozen poultry carcasses imported from Hungary in the spring of 1942. Differentiation between Newcastle disease and fowl plague is discussed and immunization experiments with adsorbate vaccine are described. Chlorine preparations and formalin used as disinfectants gave satisfactory protection. The authors state that infectious inflammation of the serosa in fowls described by Beller (1943) is identical with Newcastle disease.—E. G.

Beach, J. R. (1949.) **Results of controlled field**

trials of live-virus avian pneumoencephalitis (Newcastle disease) vaccine in California.—*Bull. Calif. Dep. Agric.* Reprint pp. 67–91. **106**

The results of preliminary laboratory tests and then of extensive field trials of a living attenuated virus prepared by a commercial laboratory. [The method of attenuation is not stated, presumably it was by egg-passage.] The tests were carried out in California by the Bureau of Livestock Disease Control of the State Department of Agriculture and by the Department of Veterinary Science, University of California. Vaccination was made by thrusting two needles moistened with vaccine through the web of one wing. When young chickens on infected farms were vaccinated the results were good and mortality caused by vaccination did not exceed 2·6%. When laying pullets were vaccinated there was retardation of egg production and mortality in one flock was 8%. There was indication that infection could spread from vaccinated to non-vaccinated susceptible birds. In some cases a vaccinated flock may remain a potential source of infection for as long as seven weeks.

The vaccine readily loses potency unless carefully handled. There is still some conjecture as to the fixed properties of the virus and some suggestion that under natural conditions it might regain virulence.—M. C.

GROUPÉ, V., & WINN, J. D. (1949.) **The characteristics of an agent morphologically resembling the Chlamydozoaceae and causing sinusitis in turkeys.**—*J. Bact.* **57.** 515–528. [Authors' summary copied *verbatim.*] **107**

The characteristics of an agent, morphologically resembling the Chlamydozoaceae, causing sinusitis in turkeys have been studied and the results are briefly summarized as follows: Morphology: small coccoid bodies varying in size from less than 0·5μ to 1μ or more usually imbedded in a matrix were found in impression smears of infected yolk sac tissue stained by Machiavello's method and within the yolk cells in sections of infected yolk sacs stained with Giemsa. Filterability: Suspensions of infected yolk sac tissue did not readily pass Berkefeld N or Seitz EK filters but passed through a Berkefeld V filter with considerable loss of infectivity. Cultivation: The agent was cultivated with ease in the yolk sac of the chicken embryo and with some difficulty in the allantoic sac or on the chorioallantois. Serological aspects: Sera from infected turkeys, in low dilutions, fixed complement in the presence of heavily infected yolk sac suspensions, but no complement-fixing antigens in common with the Chlamydozoaceae were detected. Pathogenicity: Infected yolk sac suspensions produced sinusitis in turkeys only after direct inoculation into the sinus and were not pathogenic for chickens, pigeons, or mice. Chemotherapy: The agent was not susceptible to sulfadiazine or relatively high concentrations of penicillin, but was definitely inhibited by streptomycin and aureomycin.

BREWIS, E. G., NEUBAUER, C., & HURST, E. W. (1949.) **Another case of louping-ill in man. Isolation of the virus.**—*Lancet.* **256.** 689–691. **108**

A 17-year-old shepherd boy, in whose flock on the Otterburn Hills deaths were occurring from louping-ill, contracted the disease, the clinical picture [described in detail] being of an acute encephalitis of short duration; clinical recovery was almost complete, some ataxia remaining at the time of reporting. Louping-ill antibodies were present in the boy's serum on admission to hospital on the third day of nervous symptoms, while the virus was present in the cerebrospinal fluid, from which it was recovered by intracerebral and intramuscular injection into mice.

It is suggested that human infections may not be unusual, and that some cases may escape involvement of the nervous system and pass unrecognized. A serological survey in areas where the disease occurs in sheep might reveal the extent of human infection. It was shown that both the boy's serum and the serum of a man who had contracted a laboratory infection 16 years previously neutralized the newly-isolated virus to about the same extent.—E. COTCHIN.

KUJUMGIEV, J. (1948.) Infezione umana (congiuntivite) da virus della pseudopeste aviaria in Bulgaria. **[Conjunctivitis in man in Bulgaria caused by the virus of Newcastle disease.]**—*Zooprofilassi.* **3.** No. 3. pp. 22–23. **109**

A case of conjunctivitis in a laboratory assistant caused by infection with the virus of Newcastle disease is described. The assistant had handled virus cultures on chick embryo tissue. No attempts were made to recover the virus from the infected person. Cure was effected within 23 days without subsequent complications.

Relevant bibliography is quoted.—E. G.

COLES, J. D. W. A., & STEYN, D. G. (1949.) **Ophthalmia in ruminants.**—*Fmg S. Afr.* **24.** 322 & 326. **110**

The authors consider that most cases of ophthalmia in ruminants are caused by rickettsial infection. They describe the symptoms produced and stress the remarkable resolution which may occur spontaneously, in the eye, within a very short space of time. A recovered eye is resistant to re-infection for 5–6 months, but disease in one eye does not confer immunity upon the other. While no specific remedy exists, local sedative treatment proves beneficial.

The development of prophylactic measures appears unlikely, but the authors suggest that the destruction of insect vectors, by spraying the face of every healthy animal weekly with 5% D.D.T. solution, would be a worth-while procedure.

—E. F. Lewis.

Lennette, E. H., Clark, W. H., & Dean, B. H. (1949.) **Sheep and goats in the epidemiology of Q fever in Northern California.**—*Amer. J. trop. Med.* **29.** 527–541. **111**

Epidemiological investigations of cases of Q fever in Northern California in 1948 indicated that, unlike the outbreak in Southern California, dairy cattle were not involved, but that sheep and goats were a possible source of infection.

Cattle, sheep and goats with which the human cases might have had close or casual contact were examined by the complement-fixation test for antibodies to *R. burneti*. The average prevalence of positive animals found is 2·6% for cattle, 37·9% for sheep and 43·6% for goats; horses, pigs and poultry did not appear to be infected. In many cases there were no cattle in the areas where the human infections had occurred. *R. burneti* was demonstrated in the milk of both sheep and goats by g. pig inoculation and also from the dust of sheep pens.—M. C.

Parker, R. R., & Sussman, O. (1949.) **Spontaneous infection of the brown dog tick, *Rhipicephalus sanguineus* with *Coxiella burneti*.**—*Publ. Hlth Rep., Wash.* **64.** 1159–1160. [Authors' summary copied *verbatim*.] **112**

Coxiella [*Rickettsia*] *burneti*, the infectious agent of Q fever, has been recovered from naturally infected brown dog ticks (*Rhipicephalus sanguineus*) collected in June 1948 from a dog in Phoenix, Ariz.

Anon. (1949.) **Q fever in London.**—*Lancet.* **257.** 485. **113**

Three members of the pathological staff and one nurse in a London hospital developed atypical pneumonia and all recovered. *Rickettsia burneti* has since been recovered from the blood of one of them and all of them developed agglutinins at high titre against this organism. This is believed to be the first record of this disease in the United Kingdom. There was no spread from these patients.

Smithburn, K. C. (1949.) **Rift Valley fever; the neurotropic adaptation of the virus and the experimental use of this modified virus as a vaccine.**—*Brit. J. exp. Path.* **30.** 1–16. **114**

During attempts to isolate yellow fever virus from wild-caught mosquitoes by the intracerebral inoculation of mice, S. encountered six batches of mosquitoes infected with Rift Valley fever. Passage of the virus intracerebrally in mice led to loss of hepatotropism. Experiments were therefore undertaken to study the phenomenon and it was found that following intracerebral passage the titre of virus in the brain increased whereas that in the liver and other organs fell. In one experiment, after 61 passages, virus could be detected in the liver by intracerebral but not by intraperitoneal inoculation. Intraperitoneal inoculation in series increased the titre of virus both in brain and liver. In mice infected by 67th intracerebral passage virus only minimal evidence of the characteristic lesions in the liver was present.

With these strains of virus neurotropic variants could be obtained without the use of immune serum given intraperitoneally, the procedure originally used by Mackenzie & Findlay (*V. B.* **6.** 515.) and Mackenzie *et al.* (*V. B.* **7.** 426.)

In tests on mice it was found that the neurotropic variants could be used to produce a high-grade immunity. Protection was fully developed at 14 days against the intraperitoneal inoculation of pantropic virus [probably owing to "sparing effect"]. One line of neurotropic virus used in the experiments was more lethal when given parenterally than the other, killing 33 out of 348 mice inoculated.

In tests on mice it was found that lambs four and five days old could be vaccinated with safety using a neurotropic variant and that no virus appeared in the circulating blood. Neutralizing antibody develops.

S. points out that the active immunization of young lambs might be hazardous and difficult. He studied the protective power of serum of twin lambs born of an immune ewe. One was weaned at one month of age, the other left on the dam. Enough antibody was present in the former to neutralize 10 LD_{50} of virus on the 150th day and in the unweaned lamb on the 143rd day of age. Weaning had, therefore, no effect on the slow disappearance of humoral immunity. [There can be no doubt that the ideal method of protecting flocks would be the inoculation of empty ewes with a modified virus. Unfortunately, in its natural terrain, the disease occurs only when lambing coincides with a wet period at least six years from the last severe outbreak. Farmers are therefore inclined to "wait for an outbreak". In the circumstances, the only practicable method of control is by the use of serum. Hyperimmune serum prepared in cattle has given excellent results.]—J. Richard Hudson.

Boyd, J. S. K. (1949.) **Morphological changes in bacteriophage-infected organisms as revealed by phase-contrast illumination.**—*J. Path. Bact.* **61.** 127–131. [Author's discussion copied *verbatim*.] **115**

The striking abnormality in infected organisms is the lighter substance which grows in and ultimately appears to disrupt the bacterium. There seems no reason to doubt that this is either the developing bacteriophage itself, or at least is closely associated with the formation of bacteriophage. This observation affords substantial confirmation of the generally accepted hypothesis that bacteriophage multiplies in and at the expense of the host bacterium. It does not support the theory that bacteriophage multiplication occurs in the bacterial proteins after they have escaped from the ruptured cell. Perhaps its chief interest, however, is that it indicates a method of investigation which may have a useful application in the study of viruses pathogenic to plants and animals.

OLITSKY, P. K., CASALS, J., WALKER, D. L., GINSBERG, H. S., & HORSFALL, F. L. (1949.) **Preservation of viruses in a mechanical refrigerator at –25° C.**—*J. Lab. clin. Med.* **34.** 1023–1026. [Authors' summary copied *verbatim.*] **116**

Numerous viruses can be preserved by storage in an electrically operated mechanical refrigerator at –20 to –30° C. The infectivity titer of a number of viruses did not diminish significantly after storage for three months. In spite of the fact that some showed a marked reduction in titer after nine months, none became inactivated if stored in the presence of an adequate amount of normal serum.

See also absts. **251** and **252** (livestock diseases in Australia); **256** (rinderpest); **257** (textbook on filtrable viruses); **259** (rickettsia of man).

IMMUNITY

BOORMAN, K. E., DODD, B. E., & TRINICK, R. H. (1949.) **Haemolytic disease of the newborn due to anti-A antibodies.**—*Lancet.* **256.** 1088–1091. [Authors' summary copied *verbatim.*] **117**

Two cases are described in which haemolytic disease of the newborn is believed to have been due to anti-A antibodies. In case 1 rapid destruction of group-A cells in an anaemic infant's circulation, with normal survival of group-O cells, was demonstrated.

In case 2 anti-A antibodies were recovered from the tissue cells of a deeply jaundiced infant whose red cells gave a positive direct Coombs test, and who died on the 4th day of life; at necropsy the brain showed kernicterus, and the other histological findings were consistent with a diagnosis of haemolytic disease of the newborn.

KERSHAW, B. B. (1949.) **Studies on the origin and development of normal hemagglutinins.**—*Yale J. Biol. Med.* **21.** 463–479. [Author's summary copied *verbatim.*] **118**

Investigation of normal hemagglutinins of the chick revealed titers and time of development to be in agreement with determinations made by others.

Application of heat to chicks from the time of hatching was reflected in a significantly higher titer of normal hemagglutinins for the red cells of the rabbit, rat, and guinea-pig in the heated group of chicks than was the case in the control group kept at room temperature. This difference became significant several weeks after the appearance of the antibodies. The avidity of the antibodies was the same in the heated group as in the control group kept at room temperature. The specificity as determined by agglutinin absorption tests likewise was not altered.

Antigenicity tests using the egg yolk and albumen, the red cells, and the organs of the embryo and the adult chicken as antigens showed about the same production of hemagglutinins as did the various controls. The one exception to this was the hemagglutinins for sheep cells which were probably produced in response to the Forssman antigen which is present in the chicken.

Inhibition tests using egg yolk and albumen, and the organs of embryonic and adult chickens as inhibitors showed no effect of these substances on the hemagglutinins present in normal chicken serum. An alcoholic extract of the contents of the intestinal tract of chickens showed no inhibition of the hemagglutinins. Agglutinin absorption tests using chicken red blood cells and serum likewise did not diminish the original titer.

The results of this investigation tend to substantiate Hirszfeld's theory of serogenesis by showing that the antigen for normal hemagglutinins could not be demonstrated in the tissues of the chicken and that heat can influence the production of normal hemagglutinins only after the antibody-producing mechanism has matured. Inhibition tests further verify the results found by the antigenicity studies, hence add to the argument for serogenesis.

SREENIVASAN, M. K. (1948.) **Anaphylaxis or serum sickness in cattle.**—*Indian J. vet. Sci.* **18.** 21–26. **119**

The immune sera prepared in buffaloes and blackleg vaccine consisting of formolized Noguchi medium culture induced an anaphylactic state in cattle when injected subcutaneously. A detailed description of symptoms in cattle is given. About 20% of the reacting hill cattle developed visible symptoms while severe illness was found only in about 6% and the mortality was less than 1%. The visible symptoms were induced only if two or more sensitizing injections prior to the shock dose of antigen were given. The animals were

desensitized for a week or two after the shock dose while the sensitive state prevailed for more than a year. The administration of the shock dose in small fractions at first, followed by the remainder, did not give encouraging results in preventing the anaphylactic shock.—H. S. DHILLON.

LOVELESS, M. H. (1949.) **Allergy and antihistamine therapy. A review.**—*Bull. N.Y. Acad. Med.* **25.** 473–487. [Author's summary copied *verbatim.*] **120**

The histamine antagonists effectively negate many of the effects of histamine, anaphylaxis and allergy. In man they are particularly helpful as symptomatic aids in urticaria and hay fever, are also of definite but less value in contact and atopic dermatitis as well as in vasomotor rhinitis. Their influence on non-urticarial pruritus, asthma and migraine is less impressive.

Analysis of the therapeutic effects of 11 antihistamines reported in the literature reveals that among some 18,000 trials, Trimeton, PBZ and Thephorin offered the most satisfactory control of sundry allergic symptoms without an undue number of side reactions.

Final choice of the ideal antagonists, however, will have to await evaluation of multiple agents in similar groups of allergic patients under standard conditions and criteria, preferably through the concerted efforts of several large clinics. A small group of our hay fever cases, evaluating 6 antihistamines by alternation, found Trimeton and PBZ the most satisfactory from the viewpoints of therapeutic control and toxicity.

BAIN, W. A., BROADBENT, J. L., & WARIN, R. P. (1949.) **Comparison of anthisan (mepyramine maleate) and phenergan as histamine antagonists.**—*Lancet.* **257.** 47–52. [Authors' summary copied *verbatim.*] **121**

The histamine antagonists 'Anthisan' (mepyramine maleate, 'Neoantergan,' '2786 R.P.') and 'Phenergan' ('3277 R.P.') are compared quantitatively as regards their weight-for-weight potencies, durations of action, and therapeutic efficacies in chronic urticaria.

The relative potencies of the drugs are compared by estimating the oral doses of each required to produce the same degree of reduction of the intradermal histamine weal response. Phenergan is shown to be about seven times as potent as anthisan. Thus 25 mg. of phenergan will produce on the average about the same maximum as 175 mg. of anthisan.

The relative durations of action are estimated from the times taken for the maximum effect of approximately equipotent doses of the drugs to be reduced by half. The mean half-action time for phenergan is 19½ hours, and for anthisan 5⅛ hours. Thus the maximun effect of a given dose of phenergan is likely to take 3¾ times as long to be reduced by half as is the effect of an equipotent amount of anthisan.

Anthisan and phenergan are compared therapeutically in twenty cases of chronic urticaria, anthisan having been given at the usual intervals but phenergan, because of its long duration of action, in a single dose at night.

Patients who prefer a nightly dose of phenergan to equi-effective doses of anthisan are usually those who experience less side-effects with phenergan than with anthisan, whereas those who express no preference have usually experienced no, or only very slight, side-effects with anthisan. Of these 20 patients, 14 preferred phenergan, and 5 had no preference.

The relative therapeutic potencies of anthisan and phenergan are estimated from the individual ratios between the daily dose of anthisan and the daily dose of phenergan required to produce the same therapeutic effect. Phenergan is, on the average, 14 times as potent as anthisan. Thus, a patient with chronic urticaria whose condition is controlled by 350 mg. anthisan a day, or 120 mg. three times a day, is likely to show a similar clinical response to 25 mg. of phenergan a day, given in a single dose at night. He is also likely to prefer this treatment.

The possibility that phenergan may exhibit an inhibiting effect on histaminase is noted, and a possible consequence of this action is pointed out.

See also absts. **14** (anthrax); **36** (diphtheria); **50, 52** and **53** (brucellosis); **76** (dourine); **88** (virus haemagglutinins); **92** (haemagglutination and complement fixation); **93** and **95** (equine encephalomyelitis); **101** and **102** (distemper); **104** (fowl plague); **114** (Rift Valley fever); **140** of mice with ascarids); **256** (rinderpest).

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

ZINKERNAGEL, R., & MÜHLETHALER, E. (1945.) Haematomyzus elephantis. **[Morphology of *Haematomyzus elephantis.*]** — *Schweiz. Arch. Tierheilk.* **87.** 235–241. **122**

A detailed description is given of a louse, identified by the authors as *H. elephantis* after they had studied numerous specimens of the species in various stages of development and compared their data with the description given by FERRIS (1931). The louse was found infesting the elephants of a circus in Rapperswil, Switzerland. They were present chiefly in the external auditory meatus, at the base of and behind the ears and on the cheeks. All the 14 elephants of the circus were so infested, the parasites having been introduced by an Indian elephant that had been trans-

ferred from another circus in Dresden in the autumn of 1944 and killed a few months later on account of pulmonary TB.

A single treatment of 2% " neocidol " emulsion was sufficient to kill all the parasites.—B. A. T.

CANTELLO, J. E. (1947.) **Control of stickfast flea.**—*Yearb. Inst. Insp. Stk N.S.W.* 1947. pp. 79–82. **123**

A history of the occurrence of the stickfast flea (*Echidnophaga gallinacea*) in Australia is given. Methods of controlling the spread of the flea in poultry are discussed. D.D.T. was found to be very effective and could be used either as a spray or powder. Owing to the variety of hosts of the flea great difficulty was experienced in maintaining effective quarantine.—D. F. STEWART.

BYRNE, K. V. (1947.) **The stickfast flea of poultry.**—*Yearb. Inst. Insp. Stk N.S.W.* 1947. pp. 83–88. **124**

The characteristics of the stickfast flea (*Echidnophaga gallinacea*) are described, together with the most common sites of infestation in fowls, cats and dogs. Control measures are discussed. Aqueous suspensions of D.D.T. were found to be highly effective.—D. F. STEWART.

I. DETHIER, V. G., & CHADWICK, L. E. (1947.) **Rejection thresholds of the blowfly for a series of aliphatic alcohols.**—*J. gen. Physiol.* **30.** 247–253. **125**

II. CHADWICK, L. E., & DETHIER, V. G. (1947.) **The relationship between chemical structure and the response of blowflies to tarsal stimulation by aliphatic acids.**—*Ibid.* 255–262. [Abst. in *Trop. Dis. Bull.* **46.** 404. (1949), I & II copied *verbatim*. Signed : D. S. BERTRAM.] **126**

I & II. Using blowfly adults, *Phormia regina*, from which the antennae and labella have been removed so as to eliminate the olfactory receptors, the authors test the stimulative power of certain organic compounds when brought into contact with the taste receptors of the tarsi. The flies, which are suspended by their wings from a waxed rod, respond to tarsal contact with a 0·1 M sugar solution by extending the proboscis, but this response can be prevented by the addition of an organic substance to the sugar solution. That concentration of a graded series of dilutions of the added substance which prevents the proboscis reaction is taken as a measure of the substance's stimulative efficiency, and is referred to as its threshold of rejection. The technique has enabled series of related organic compounds to be tested and their stimulatory efficiency to be compared with their chemical structure and properties.

In the first paper, the authors report studies on fifteen aliphatic alcohols and, in the second paper, on eighteen aliphatic acids and one mineral acid. It is concluded that stimulation by the alcohols and the acids involves surface energy relationships but it is not certain whether their penetration into the receptor cells or accumulation in the cell membranes causes the excitation. The hydrogen ion is the most stimulative component of the acid compounds and it is concluded that the anion, rather than the undissociated acid, is next in importance. Substitutions and other structural alterations to the acid molecule lessened the stimulative power of the anion, but this was counteracted usually by increased dissociation of the acid resulting in increased stimulatory efficiency due to the hydrogen ions.

The technique is recommended as having applications in the development of improved insect repellents and, possibly, for work on insecticides.

BUREN, W. F. (1948.) **Viable insect egg mass transported on outside of aircraft.**—*Publ. Hlth Rep., Wash.* **63.** 1404. **127**

Eggs from a moth of the family Phalaenidae, which includes many insects of agricultural importance, travelled unharmed on the wing of a Brazilian aeroplane which landed in the U.S.A. —S. BRIAN KENDALL.

SACKTOR, B., HUTCHINSON, M., & GRANETT, P. (1948.) **Biology of the lone star tick in the laboratory.**—*J. econ. Ent.* **41.** 296–301. [Authors' summary and conclusions copied *verbatim*.] **128**

The lone star tick, *Amblyomma americanum* (L), can be successfully reared in quantity in the laboratory. The rabbit is a satisfactory host animal on which 73 per cent of the inoculated larvae, and 80 per cent of the inoculated nymphs successfully replete. A modification of the capsule method is utilized for infesting the host animal.

From the data presented, 30° C. is closest to the optimum for the moulting of engorged larvae and engorged nymphs. A relative humidity of from 85 to 100 per cent is most favourable. The average life cycle when all stages are incubated at 30° C. is as follows: The engorged female lays 3500 eggs, which require an incubation period of 25 days. The larvae engorge in from 4 to 5 days, from which the nymphs moult on the tenth day. The nymphs engorge after 5 days feeding, and the adults emerge after 16 days. The fertilized female engorges on the thirteenth day after attachment, and begins oviposition 7 days later. The average time to complete a generation is therefore 81 days. In laboratory practice, 2 weeks are allowed between the ecdysis and reinoculation. Thus the complete life cycle can be obtained in approximately 4 months.

MIQUEL, P. (1948.) A propos d'une épizootie de gale sarcoptique équine. [**An outbreak of sarcoptic mange in horses.**]—*Rev. vét. milit.* **3.** 178–197. **129**

A mixture containing benzene hexachloride, cresol and soda solution was diluted 1 : 200 with water and applied by means of a spray operated by a petrol-driven compressor. Sulphur in a white oil emulsion and a benzyl benzoate preparation gave better results. In a small trial M. found that a mixture of sodium hyposulphite and tartaric acid was not very effective.—E. P. P.

KEMPER, H. E., & ROBERTS, I. H. (1949.) **Benzene hexachloride dip to destroy scab mites on unborn [? unshorn] sheep.**—*Vet. Med.* **44.** 168–169. **130**

The authors record experiments to determine the general effectiveness of benzene hexachloride against mange; the time required by various concentrations of the γ-isomer to kill the sheep scab mites, and the longevity of the odour and taste of benzene hexachloride in the flesh of newly dipped sheep. No controls were employed.

In the first experiment, 35 sheep were selected from six farms and divided into seven groups. Two types of wettable benzene hexachloride were employed:—a commercial powder containing 50% technical grade benzene hexachloride composed of all isomers but with 6% γ-isomer and a product containing 25% benzene hexachloride, with a 95% γ-isomer content. Using various concentrations of these products, the sheep were in the dip for two min. and their heads submerged at least twice. They were isolated in small fenced pastures and examined for the presence of mites at 14-day intervals over a period of six weeks. The two samples of benzene hexachloride proved to be equally effective acaricides in the concentrations used. Using dips containing 0·03% and 0·06% γ-isomer, no live mites were discovered in any of the subsequent examinations, although dead mites were found on the 28th and 42nd days; these may have been trapped within the masses of incrustations.

No ill effects were reported from the dips and, in general, subsequent healing of the lesions was rapid. However, in some animals the rate of healing and wool-growth was considered subnormal, but faeces examination in these cases revealed an extremely heavy nematode infestation.

During the experiment it was noted that the benzene hexachloride also destroyed lice (*Bovicola ovis*) and ticks (*Amblyomma americanum* and *A. maculatum*) on the sheep.

In a second experiment with four sheep from two farms—all with very heavy mite infestations, the benzene hexachloride containing 6% γ-isomer was used in varying concentrations. After dipping, the sheep were penned individually and examined at irregular intervals up to 44 hours, mites taken from the wool being examined microscopically.

A dip containing 0·00375% γ-isomer failed to eradicate an infestation from one ewe; a concentration of 0·0075% destroyed all mites on one ram in less than 44 hours; a concentration of 0·015% destroyed all mites on another ram within two and three quarter hours.

The sample of benzene hexachloride containing the high proportion of the γ-isomer lost its musty odour much more rapidly than the technical benzene hexachloride. The detection of odour and taste of benzene hexachloride in the flesh of recently dipped sheep was investigated.

Using therapeutic concentrations (0·06% γ-isomer) it was found that the meat was at no time offensive whilst the taste and odour were barely detectable. In a period of three weeks following dipping, the odour and taste became indistinguishable.

The authors recommend a concentration of not less than 0·06% γ-isomer in the dips, so as to allow for the numerous factors affecting the actual concentration which reaches the fleece.—K. B. S.

CROGAN, W. E. (1949.) **Trombidiosis of sheep in New South Wales.**—*Aust. vet. J.* **25.** 103–104. **131**

Until the present report trombidiosis of sheep caused by *Trombicula sarcina* was thought to be confined to the black soil regions of the Central Highlands of Queensland [*V. B.* **17.** 23.]

C. describes an outbreak in a flock near Narrabri on the north-western slopes of N.S.W. which affected nearly 100% of the sheep, which had scaly lesions on the feet and lower part of the legs, with pus under the scales in many cases. Irritation was severe and sheep continually rubbed and bit the affected parts. The owner became infected and it is thought that a horse also contracted the disease. Treatment with lime-sulphur appeared to kill the mites in the lesions, but did not prevent re-infestation. The outbreak cleared up after a series of heavy frosts.

Of the few kangaroos and wallaroos, numerous rabbits and many field mice on the property, only a number of rabbits were examined, but no mites were found.—H. McL. GORDON.

See also absts. **112** (*Rickettsia burneti* in ticks); **251** and **252** (in Australia).

PARASITES IN RELATION TO DISEASE [HELMINTHS]

KENDALL, S. B. (1949.) *Lymnaea stagnalis* **as an intermediate host of** *Fasciola hepatica.* [**Correspondence.**]—*Nature, Lond.* **163.** 880–881. **132**

F. hepatica developed in laboratory-bred *L.*

stagnalis; cercariae emerged which encysted and produced fluke infestation in rabbits. This is the first time complete development has been obtained in a snail other than *L. truncatula*; the observation is probably of little veterinary importance, however, because of the aquatic habits of the snail.
—G. M. URQUHART.

PRIOUZEAU, M. (1947.) La paramphistomose bovine en Vendée. **[Paramphistoma infection in cattle in France.]**—*Thesis, Alfort.* pp. 94. **133**

This thesis presents an account of the paramphistomes with particular reference to *Paramphistomum cervi*. It is concluded that in Vendée the intermediate host is *Helix nemoralis* and that from the habits of the snail an outbreak of the disease is likely to follow a season of drought. Disease is evidenced by a chronic gastritis and the worms may be eliminated with the aid of tetrachlorethylene.—S. BRIAN KENDALL.

LEIPER, J. W. G. (1949.) **Continuous sedimentation for the concentration of trematode eggs in faecal suspensions. [Correspondence.]**—*Nature, Lond.* **163.** 908. **134**

Faecal suspensions can be concentrated and colouring matter removed by sedimentation from a glass funnel, the lighter fraction being automatically siphoned from the top of a closed glass cylinder slightly lower than the funnel and connected with it by a length of tubing. The apparatus, a diagram of which is given, is not satisfactory for nematode eggs, the specific gravity of which approaches that of water.—S. BRIAN KENDALL.

HSU, K. C. (1948.) **A survey of the helminths of dogs in Chengtu, Szechuan.**—*Chin. med. J.* **66.** 366–370. [Abst. from author's summary.] **135**

Out of 169 dogs examined for worm parasites 157 were infested with nematodes, 14 with trematodes and 118 with cestodes. Some dogs harboured as many as seven different species.

Of trematode species *Clonorchis sinensis* was found in six dogs, *Metagonimus yokogawai*, *Paragonimus* spp and *Microtrema truncatum* in three dogs, the latter being reported for the first time as occurring in dogs in China. Cestodes were *Taenia hydatigena* in 45 dogs, *Diphyllobothrium mansoni* in 38 and *Dipylidium caninum* in 93. Of nematode species *Ancylostoma caninum* was found in 133 dogs, *A. braziliense* in 67, *Uncinaria stenocephala* in two, *Toxocara canis* in 25, *Spirocerca sanguinolenta* in 42, *Dirofilaria immitis* in 101 and *Thelazia callipaeda* in 11 dogs.—E. G.

MOHAN, R. N. (1948.) **Verminous pneumonia in animals in Bengal.**—*Indian J. vet. Sci.* **18.** 33–36. **136**

Pneumonia in domestic animals, caused by *Dictyocaulus viviparus* in cattle, *D. filaria* in sheep, *Varestrongylus pneumonicus* in goats and *Metastrongylus apri* in pigs, are described. *D. filaria* infestation in goats and *V. pneumonicus* in sheep are also recorded.—C. SEETHARAMAN.

KRANEVELD, F. C., & DJAENOEDIN, R. (1947.) Rapport over een onderzoek naar de oorzaak van ziekte- en sterfgevallen onder geiten op het particuliere land Tjakoeng en daarop aansluitende proeven over de waarde van diverse behandellings-methoden van worminfecties bij geiten en schapen. **[Treatment of nematode infestation in goats and sheep in Tjakoeng (Dutch East Indies).]**—*Ned.-Ind. Bl. Diergeneesk.* **54.** 262–274. [English summary.] **137**

Phenothiazine was used with good results against *Haemonchus contortus* and *Oesophagostomum columbianum* in goats and sheep, but was less satisfactory against *Trichuris* and *Trichostrongylus*.
—E. G.

MACPHERSON, O. (1946.) **Some notes on the choice and methods of administration of anthelmintics for pigs.**—*Yearb. Inst. Insp. Stk N.S.W.* 1946. pp. 61–65. **138**

Control of internal parasites of pigs is discussed briefly with emphasis on the prevention of reinfestation. A table of anthelmintics indicates the drug and dose to be used for each species and the interval at which treatment should be repeated. The method of administration and the restraint of the pig is described.—D. F. STEWART.

BEARDWOOD, J. C. (1947.) **Ascaris infestation in pigs; field trial with sodium fluoride and oil of chenopodium.**—*Yearb. Inst. Insp. Stk N.S.W.* 1947. pp. 73–77. **139**

In a relatively small trial both oil of chenopodium (1 ml. per 25 lb. body weight) in castor oil and sodium fluoride (0·15 g. per 1 lb. body weight) were found efficient as anthelmintics against *Ascaris lumbricoides*. The oil of chenopodium was administered by stomach tube and the sodium fluoride as a powder mixed with damp mash. No serious toxic effects were caused by the sodium fluoride but the pigs receiving the sodium fluoride did not gain weight as rapidly as the controls.—D. F. STEWART.

SPRENT, J. F. A., & CHEN, H. H. (1949.) **Immunological studies in mice infected with the larvae of *Ascaris lumbricoides*. I. Criteria of immunity and immunizing effect of isolated worm tissues.**—*J. infect. Dis.* **84.** 111–124. **140**

It has been found that infestation with *A. lumbricoides* is followed by the production of antibodies even in rodents in which the life-cycle of the nematode is not completed. The authors describe experiments to find whether any of the tissues or fluids of ascaris cause the production of the effective antibodies. Using as criteria of

immunity (a) the relationship between the number of worm larvae recovered from the mouse liver and the total number of larvae in liver and lungs, (b) the growth of the larvae and (c) the inflammatory reactions in the liver and lungs, it was found that substances obtained from the bodies of ascaris worms and homologous rabbit antiserum were not consistently effective.—S. B. KENDALL.

ALLEN, R. W., & SPINDLER, L. A. (1949.) **Note on the natural occurrence in farm-raised chickens of encysted third stage larvae of *Physocephalus sexalatus*, a spirurid stomach worm of swine.**—*Proc. helminth. Soc. Wash.* **16.** 1–3. **141**

The third stage (infective) larvae of *Physocephalus sexalatus* are ordinarily found in the body cavities and tissues of various Coleoptera. When infected beetles are eaten by pigs excystation occurs and the parasite develops to maturity. If the beetles are eaten by animals other than pigs excystation may occur, but normally they re-encyst in the gut wall instead of completing development. Such encysted parasites can develop to maturity in the ordinary way in pigs or may again re-encyst in a wide range of aberrant hosts.

The authors report the discovery of encysted *P. sexalatus* in domestic fowls and summarize tests on the ability of the larvae to develop in pigs and to re-encyst or develop in the g. pig. Re-encystation occurred in several instances in g. pigs but in the stomach of one, which was known to have been maintained on a deficient diet, a nearly adult worm was found to have developed, and it is suggested that the natural immunity of aberrant hosts may be related to the plane of nutrition.

—S. BRIAN KENDALL.

See also abst. **210** (*Taenia saginata*).

SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCAEMIAS [INCLUDING FOWL PARALYSIS]

ISAKSSON, A. (1946.) Ett fall av akut leukemisk myelos hos svin. [**Acute myeloid leucaemia in a pig.**]—*Skand. VetTidskr.* **36.** 663–672. [Abst. from English summary.] **142**

The carcass and organs of a three-month-old pig which became paralysed after repeated attacks of diarrhoea were investigated.

Numerous tumour-like myeloid proliferations in the spongy and partly in the compact substance of the vertebrae, myeloid infiltration in the epidural space, myeloid nodules in the epiphyses and diaphyses of the long bones and the periosteum of the ribs were observed. Inside the cranium a tumour of the size of a hen's egg was found, which had destroyed the spongy and compact substances and had infiltrated the dura mater and the periosteum. In the lymph nodes there was a moderate myeloid hyperplasia. Smaller nodules were observed in the liver and kidneys. Some of the proliferations were tumour-like, others resembled myeloid hyperplasia.—E. G.

BRACA, F. (1940.) Il comportamento delle fibre reticolari nei tumori degli animali domestici. [**Behaviour of reticular fibres in tumours of domestic animals.**]—*Nuova Vet.* **18.** 220–225. **143**

B. records his observations on 62 selected tumours of domestic animals. Thirty-two of these were of epithelial, the rest of connective tissue origin. In general he found the arrangement of reticular fibres of value in the differentiation of the two classes if a sufficiently wide field was examined. He makes especial reference to testicular tumours of tubular and interstitial origin.—W. PLOWRIGHT.

DALTON, A. J., KAHLER, H., KELLY, M. G., LLOYD, B. J., & STRIEBICH, M. J. (1949.) **Some observations on the mitochondria of normal and neoplastic cells with the electron microscope.**—*J. Nat. Cancer Inst.* **9.** 439–449. [Authors' summary copied *verbatim*.] **144**

Mitochondria of normal and neoplastic cells were isolated in various concentrations and combinations of electrolytes and non-electrolytes. Examination of such material under the electron microscope clearly revealed the presence of a membrane which in some instances was wrinkled and torn. Experiments indicated that this membrane is semipermeable.

Evidence has been found which suggests that in some cell types, mitochondria may exist which are too small to be visualized with the light microscope.

The size of the particulate material within mitochondria at fixation has been found to be dependent upon the suspending medium in which they were isolated. Relatively large particles (60 mμ–100 mμ) were found in mitochondria isolated in physiological saline while a considerably smaller granular substance was found in mitochondria isolated in 0·88 molar sucrose.

The significance and implications of these findings have been discussed.

BRANDLY, C. A., THORP, F., Jr., & PRICKETT, C. O. (1949.) **Response of chicken embryos to tissues of chickens affected with the avian leukosis**

complex and to tissues of normal birds.—*Poult. Sci.* **28.** 486–498. **145**

Experiments are described in which the leucosis complex was established in embryonated hens' eggs, by the injection of material from chickens previously inoculated with Strain 1 (lymphomatosis-Brandly), Strain 3 (lymphomatosis-osteopetrosis-Brandly) or Strain 4 (erythrogranuloblastosis).

Other embryos were injected with material from apparently normal birds, and such material proved capable of inducing similar lesions. P.M. findings in inoculated embryos are described; the authors consider the changes in the long bones and in the liver to be significant. The route of inoculation was found to influence the result. The manifestations of the leucosis complex in chicks hatched from inoculated eggs is discussed.

Chicks 1–26 days old were also injected, and whole blood from birds inoculated with Strain 4 proved more effective than the corresponding plasma in producing erythrogranuloblastosis, although the contrary had been found with embryos.

Serial passage was unsuccessfully attempted. —M. R. Ormerod.

Woods, M. W., du Buy, H. G., Burk, D., & Hesselbach, M. L. (1949.) **Cytological studies on the nature of the cytoplasmic particulates in the Cloudman S91 mouse melanoma, the derived Algire S91A partially amelanotic melanoma, and the Harding-Passey mouse melanoma.** —*J. Nat. Cancer Inst.* **9.** 311–323. [Authors' summary copied *verbatim.*] **146**

The Cloudman S91 melanoma has been observed to contain tumor cells of three types with respect to cytoplasmic granules visible by light and phase microscopy: (1) Cells with melanized granules only; (2) cells with colorless granules only; and (3) cells with all proportions of melanized and colorless granules. The derived S91A Algire partially amelanotic melanoma contained predominantly cells possessing only colorless granules of the same type as those in the amelanotic cells of the parent melanoma. The various types of granules described were the only cytoplasmic structures in the tumor cells that stained with Janus green B under conditions not resulting in nuclear staining.

The tumor cells proper of the Harding-Passey mouse melanoma were branched melanoblasts, in which either colorless granules or granules in all stages of melanization, could be found in the nucleated portion (perikaryon). The elongated dendrites of the cells contained only granules of uniform melanization. Completely amelanotic tumor cells were not observed in the Harding-Passey tumor.

In contrast with Janus green B, which stained both melanized and nonmelanized granules of the S91 and Harding-Passey tumors, neutral red stained the first type of granule only. If the melanin granules were first stained with neutral red, they did not become colored by Janus green B.

NUTRITIONAL AND METABOLIC DISORDERS

Kon, S. K. (1945.) **The nutritional role of microflora in the alimentary tract. Synthesis of vitamins by micro-organisms of the alimentary tract.**—*Proc. Nutr. Soc.* **3.** 217–229. Discussion pp. 229–238. **147**

This section of the symposium on the nutritional role of microflora in the alimentary tract is a review of the microbiological synthesis of the vitamins in ruminants, non-ruminants and in man. Particular reference is made to the vitamins of the B complex and the inhibition of their synthesis by the sulphonamides. The discussion is largely concerned with the problems of refection.—M. W.

Marshall, R. A., & Phillipson, A. T. (1945.) **The nutritional role of microflora in the alimentary tract. The production and adsorption of the volatile acids in the rumen.**—*Proc. Nutr. Soc.* **3.** 238–243. **148**

The nature of the carbohydrate eaten, its quantity and the quantity of food in the reticulum and rumen implies that rumen fermentation must be considerable. A mixture of fatty acids of low molecular weight is the chief end-product containing butyric, propionic and acetic roughly in the proportion of 2 : 3 : 6. Along the intestinal tract most volatile acid (as acetic) is in the rumen and reticulum, then in the caecum, colon and rectum with still less in the small intestine, omasum and abomasum. The concentration in peripheral blood and blood from different parts of the alimentary tract indicated that most was in the posterior rumen, followed in order by the anterior rumen, reticulum, caecum, omasum, jugular vein and small intestine.—M. Woodbine.

Elsden, S. R. (1945.) **The nutritional role of microflora in the alimentary tract. Volatile fatty acids in the rumen of the sheep.**—*Proc. Nutr. Soc.* **3.** 243–247. **149**

E. records the continuation of the fermentation of pure carbohydrates and deals more specifically with glucose and rumen micro-organisms *in vivo* and *in vitro*. *In vivo* the ratio of acetic to propionic acids decreases following glucose administration to a minimum at 3–6 hours

and then returns to its starting level over the following 24 hours. *In vitro* also the same course is followed, more propionic acid is produced and the microbial flora appear similar, more yeasts and less iodophile bacteria being produced. The ruminant's diet conditions the type of rumen flora —a yeast-like form becomes dominant on a diet rich in fermentable carbohydrate, a coccus also develops which ferments glucose and starch, and also stores a polysaccharide, and members of the *Propionibacterium* group are present which produce propionic acid and part of the acetic acid.—M. W.

BARCROFT, J. (1945.) **The nutritional role of microflora in the alimentary tract. The utilization of volatile acids.**—*Proc. Nutr. Soc.* **3.** 247–251. Discussion pp. 251–254. **150**

Considering the utilization of the volatile acids, the average amounts in blood from various vessels are first discussed. Most is found in the veins from the rumen and large intestine. By measuring blood flow and concentration of volatile acid it is estimated that about 100 g. of volatile acid (as acetic) is absorbed per day from the rumen of the sheep. About 80% is acetic acid and most of the remainder is propionic. Very little of these acids is excreted as such and it appears that a large proportion is utilized by the heart.—M. W.

CHENG, K.-K. (1949.) **An experimental study of the relationship between plasma proteins and liver disturbance.**—*J. Path. Bact.* **61.** 23–47. [Author's conclusions copied *verbatim.*] **151**

The above survey suggests that the present state of our knowledge of the origin of plasma proteins is highly unsatisfactory. The custom of assigning the role of protein production mainly to the liver has apparently sprung from the frequent association of liver diseases with alteration of the plasma-protein level. But the experimental evidence brought forward in support of a hepatic origin is inconclusive and open to serious criticism. The author has failed repeatedly in attempts to induce disturbance of plasma-protein behaviour by subjecting the liver experimentally to severe damage. The facts elicited therefore lead to the conclusion that, in the past, too much emphasis has been placed on the part played by the liver in the elaboration of plasma proteins. The mechanism of synthesis is likely to be far more complicated and extra-hepatic factors probably intervene. The numerous and diverse sites of origin proposed suggest that different plasma proteins may be manufactured in widely separated organs and cells with different mechanisms of synthesis. Evidently much more data on this subject are needed in respect of both normal and pathological plasma proteins.

GYÖRGY, P., & GOLDBLATT, H. (1949.) **Treatment of experimental dietary cirrhosis of the liver in rats.**—*J. exp. Med.* **90.** 73–84. [Authors' summary copied *verbatim.*] **152**

Dietary cirrhosis of the liver was produced in 223 rats, and then therapy of the condition attempted. Administration of lipotropic factors (casein, methionine, choline) was followed not only by reduction of fat infiltration and by regeneration of hepatic parenchyma but, by a reduction of the degree of the fibrosis. In one group of rats, comparison of sections obtained by biopsy, before treatment, with findings at necropsy, after completed therapy, indicated apparent reduction of the fibrosis and of the amount of ceroid and considerable restoration of architecture. This improvement, however, was obtained neither with complete regularity nor in a short time. In very severe cirrhosis, as a rule, the effect of a lipotropic diet was disappointing, even after prolonged treatment up to 200 to 240 days. It is assumed that factors determining prevention are beneficial only to a limited extent in treatment. The therapy of very severe cirrhosis may require the interaction of further beneficial factors (nutritional and hormonal).

Best therapeutic results were obtained by the combination of an adequate amount of casein with methionine or liver extract, and by the combination of methionine with liver extract. Methionine and thiouracil, both of which, singly, are effective in the prevention of dietary hepatic cirrhosis in rats, have proved to be less effective for the therapy of cirrhosis, when administered together, than methionine given alone for the same purpose. Under identical conditions, female rats have shown greater resistance to the production of dietary hepatic cirrhosis and a more favorable response to therapeutic dietary factors, than male rats.

GRIFFITHS, W. J., Jr. (1947.) **Audiogenic fits produced by magnesium deficiency in tame domestic Norway rats and in wild Norway and Alexandrine rats.**—*Amer. J. Physiol.* **149.** 135–141. **153**

G. produced audiogenic fits in domestic and wild Alexandrine rats fed a diet lacking magnesium. On alternate days the rats were tested for susceptibility to audiogenic seizures with the aid of an air blast. The rats kept on magnesium deficient diet had tonic-clonic spasmodic fits immediately they were exposed to air blasts, while controls fed a normal diet were not affected. Domestic and wild rats had running fits also.

Domestic rats generally died during the first fit. None survived more than four fits. Wild rats survived 6–19 fits during a test period of 50–55 days.—E. G.

MCILWAIN, H. (1946.) **The metabolism and**

functioning of vitamin-like compounds. 3. Products of the decomposition of glutamine during streptococcal glycolysis.—*Biochem. J.* **40.** 460–464. 154

Non-proliferating suspensions of haemolytic streptococci in saline were able to convert *l* (+) -glutamine to *l* (+)-glutamic acid and ammonia in the presence of glucose. The reaction was studied in Warburg vessels and on a larger scale in 250 ml. flasks. No reaction was observed in the absence of glycolysis but no intermediate compounds were detected which would link decomposition of glutamine with glycolysis. The rate of decomposition of glutamine by the suspension was of the same order as the rate at which glutamine or glutamic acid would be assimilated by the growing organism.—A. M. Copping.

Jacobson, W. C., Converse, H. T., & Moore, L. A. (1949.) **Effects of vitamin A and carotene intake on depletion time of young dairy calves.**—*J. Dairy Sci.* **32.** 418–428. 155

The time required to reduce the plasma vitamin A levels to 4 μg. per 100 ml. was determined in 52 Jersey and Holstein calves placed on a vitamin A-free diet at 90 days. Two calves were reared with dams on pasture, and others after receiving colostrum for three days were given restricted milk intakes, with or without additional vitamin A supplements at two different levels for varying times. It was found that the depletion time, as measured above, was well correlated with the previous vitamin A intake.

The authors discuss the value of supplemental vitamin A feeding and their data suggest that weight gains were greater while mortality and incidence of scours were less in groups receiving supplements.—P. Herbert.

Sjöberg, K., & Sandstedt, H. (1944.) A-vitaminundersökningar på nötkreatur. [**Vitamin A experiments with cattle.**]—*Svensk VetTidskr.* **49.** 2–18. [German summary.] 156

A pregnant cow, fed for five months a diet with a relatively low carotene content, *i.e.*, 33–16 mg. per day, developed no typical vitamin A deficiency symptoms, but P.M. it was found that almost all the vitamin A reserves in the liver had been used up. During the trial period the blood serum carotene and vitamin A content sank continuously and the vitamin A content of the milk was very low throughout the period. The first milking of colostrum after calving had a normal carotene and vitamin A content, but in the following milk samples these values rapidly sank to very low levels. The calf, born at normal term, had no visible deficiency symptoms, but the liver vitamin A content was lower than normal when the calf was slaughtered at one week old, having been suckled by its dam. In small-scale experiments in calves there was a direct correlation between the carotene and vitamin A content of the fodder consumed and the carotene and vitamin A content of the blood serum. Calves one week old were able to avail themselves of the carotene in plants such as carrots and in the form of carotene concentrates. A daily dose of about 100 μg. per kg. was found to be sufficient for the animal's needs and for normal storage of vitamin A in the liver.

—F. E. W.

Whiting, F., Willman, J. P., & Loosli, J. K. (1949.) **Tocopherol (Vitamin E) deficiency among sheep fed natural feeds.**—*J. Anim. Sci.* **8.** 234–242. 157

Sixty-eight ewes received during the winter a diet producing a high incidence of " stiff lambs ". Twenty of these ewes also received mixed natural tocopherols (80 mg. powdered concentrate) for approximately six weeks until lambing. Of 68 lambs, reared to three weeks, 31 developed signs of muscular dystrophy at 3–5 weeks, ten being from ewes which had received supplements. Tocopherol levels for the ewes were determined in blood plasma, colostrum and milk, and found to be lower than in a control flock fed a diet not productive of " stiff lambs ". The supplementation raised these levels, but not to those of the controls.

All the " stiff lambs " were treated with cold-pressed wheat-germ oil, with solvent extracted wheat-germ oil or with dl-α-tocopherol, and it is stated that most of the lambs recovered within 4–7 days, although the plasma tocopherol was not significantly raised by treatment.

The ratio of total to pre-formed urinary creatinine was found to be high in these lambs and reduced following treatment.—P. Herbert.

I. Wagley, P. F., & Morgan, H. R. (1948.) **Effects of folic acid antagonists inoculated in embryonated eggs.**—*Arch. Path.* **46.** 441–450. [Authors' summary copied *verbatim.*] 158

II. Woll, E. (1948.) **Effects of folic acid deficiency and a folic acid antagonist on chicks.**—*Ibid.* **46.** 559–566. [Author's summary and conclusions copied *verbatim.*] 159

I. A new technic has been employed for the study of folic acid inhibitors. By this technic it was shown that 4-aminopteroylglutamic acid caused marked changes in the hemopoietic tissue of embryonated eggs comparable to those described in other species. The blood islets of the yolk sac showed diminution in number and size with decreased cellularity. The remaining nuclei showed pyknosis, karyolysis and karyorrhexis. This effect was less marked in the presence of relatively large amounts of folic acid. In the dose

employed, liver injection U.S.P. (solution liver extract purified,[R] 15 U. S. P. units per cubic centimeter) and vitamin B_{12} did not alter the effects of 4-aminopteroylglutamic acid in the yolk sac blood islets. N^{10}-methylpteroic acid in relatively large doses had no appreciable effect. Methyl-4-aminopteroylglutamic acid caused much less change in the blood islets than did comparable doses of 4-aminopteroylglutamic acid.

II. Folic acid deficiency was produced in chicks by feeding a folic acid-free diet or by administering a folic acid antagonist to them. The animals were killed at frequent intervals and the viscera, bone marrow, brain, skin and skeletal muscle examined grossly and microscopically.

Folic acid deficiency of chicks is characterized by: (a) a rubriblastic, anemic and granulopenic marrow, the deterioration of which progresses to a total aplasia with slight hemosiderosis; (b) degeneration of the glandular epithelium of the small and large bowel and, to a lesser extent, of the mucosa of the esophagus and the tongue, characterized by swelling of the cells and their nuclei, loss of normal cell configuration, gland retention cysts and ultimately atrophy.

Identical lesions are produced by a folic acid antagonist, such as 4-aminopteroylaspartic acid. In the older animal the antagonist-induced deficiency is not so impressive. The possible implications of the observations with respect to tropical sprue and Rous sarcoma are discussed.

KRANEVELD, F. C., & DJAENOEDIN, R. (1947.) Haaruitval bij dieren na voedering met lamtoro (*Leucaena glauca*). **[Loss of hair in animals after feeding with** *Leucaena glauca*.**]**—*Ned.-ind. Bl. Diergeneesk.* **54.** 170–180. [English summary.] **160**

Loss of hair in horses fed on *L. glauca* was observed in Indonesia. The effect was most evident in tail and mane. Three out of five horses were also affected with superficial pododermatitis and catarrhal enteritis. Whether there is an aetiological relation between these symptoms was not ascertained. After some time hair started to grow again in spite of continued feeding with *L. glauca*. Pigs fed on *L. glauca* lost hair on neck and back. Goats, rabbits and g. pigs were not affected.

Mimosine extracted from this plant is regarded as the possible cause.—E. G.

PISTOR, W. J., & CARDON, B. P. (1949.) **Idiopathic hemoglobinuria in cattle.**—*J. Amer. vet. med. Ass.* **114.** 429–431. **161**

In Arizona about 200,000 cattle are fed each year on irrigated farms and losses from idiopathic haemoglobinuria range from 1% to as high as 20% (in one herd of 3,500 cattle) with an average of 5%. Cattle over six months old are affected when fed on green pastures of alfalfa, barley, oats or bermuda grass. The water supply is from irrigation ditches or large earthen tanks, but the pastures are usually dry before they are grazed. Symptoms appear after the cattle have grazed for over two weeks: an affected animal is depressed with a temperature of over 103°F. and stands away from the herd. The urine is dark red and urination is frequent. As the disease progresses the animal becomes weak and often falls. The average course is about 24 hours, varying from 6–72 hours, and the mortality rate may be more than 90% of affected animals.

On P.M. examination the abdominal and thoracic cavities contain blood-stained fluid, and there are extensive haemorrhages on the pleura and peritoneum. The abomasum and intestines are inflamed, and the kidneys congested with numerous brown spots on the cortex. The bladder is normal except for the blood-stained urine. Liver sections reveal necrotic areas and, when stained with silver nitrate, numerous bodies like leptospira. Kidney sections reveal necrosis of the tubule epithelium; in one outbreak only, leptospira were isolated. Blood studies reveal a rapid haemolysis.

In most outbreaks losses stop after a few days on dry food, and supplementary dry feeding cuts down losses. Aerobic and anaerobic cultural examinations and animal inoculations were negative; studies of Ca and P levels in blood were inconclusive; toxic plants were not present; food analyses were of no value and molybdenum was not present in toxic amounts. Detailed studies did not substantiate a diagnosis of *Leptospira* infection, and no conclusions were reached.

—J. O. L. KING.

MCBARRON, E. J. (1945.) **Variations in mineral imbalance syndromes observed under field conditions.**—*Yearb. Inst. Insp. Stk N.S.W.* 1945. pp. 43–49. **162**

A syndrome in cattle associated with overfeeding on green succulent pastures is described. The symptoms resemble those of mineral imbalance, although by analysis it was found that the Ca and Mg values of the blood were within the normal range. Two cases, in which the condition was prolonged for ten days and ketone bodies were present in the urine, responded promptly to glucose therapy.—D. F. STEWART.

VAUDEY, R. (1946.) Rapports de l'ostéomalacie, de l'hémoglobinurie et de la stérilité de la vache dans le département de l'aube. **[Connexion between osteomalacia, haemoglobinuria and sterility in cattle in the Aube district.]**—*Thesis, Alfort.* pp. 92. **163**

Following a discussion on soil mineral composition in the Aube district, the author refers to the frequency of osteomalacia, haemoglobinuria and sterility in the cattle of these parts. In a clinical study he correlates the symptoms, which pass from a primary digestive disturbance on to locomotor changes and haemoglobinuria, with a progressive hypophosphataemia. He considers that the fundamental cause is an unbalanced diet, particularly in the Ca : P ratio, coupled with poor hygiene and excessive milk production. The use of superphosphate fertilizers is recommended for prophylaxis. Infusion of calcium phosphate *per rectum* gave good results in haemoglobinuria.

—K. B. Sinclair.

Judge, D. J., Cassidy, J. E., & Rice, E. C. (1949.) **Intestinal emphysema in infants. A review of the literature, with seventeen new cases reported.**—*Arch. Path.* **48.** 206–211. **164**

Seventeen cases which occurred at one hospital between Jan. 1945 and Sept. 1947 are described. The literature of this rare condition in man is reviewed and the various theories of causation which have been advanced are discussed. The authors believe that the condition is always associated with an alteration in the mucosa allowing entrance of bacteria and gas, aided by peristalsis or spasm of the intestine. The bacteria after entering the wall of the intestine may produce gas which penetrates breaks in the mucosa traversing the lymphatic channels. The typical gross appearance of the intestine is described as that of "sponge rubber."

[This condition is well known in pigs, being first described by Mayer in 1815. It has generally been seen in apparently healthy pigs in slaughter houses. It has been described by Cadeac (1908), Joest (1919), Glasser (1927) and is not uncommon in Kenya [Hudson, J. R., personal communication]. Biester, H. E., Eveleth, D. F., & Yamashiro, Y. (1936) [see *V. B.* **6.** 823.] also Eveleth, D. F., & Biester, H. E. (1938) [see *V. B.* **8.** 788.] encountered the condition in pigs fed on an experimental diet which contained 78·7% of polished rice. They were able to reproduce it on several diets and concluded that it results from a dietary insufficiency of some factor in the vitamin B complex. The factor is not vitamin B_1 and is contained in whole maize, unpolished rice, skim milk powder and in yeast.]—M. C.

Blaxter, K. L. (1948.) **The effect of iodinated casein on the basal metabolism of the sheep.**—*J. Agric. Sci.* **38.** 207–215. **165**

Two ewes weighing 28 and 30 kg. respectively were trained to lie quietly. Basal metabolism was determined on fourth day of fast, as 860 Calories per square metre per day. Earlier figures for this are discussed.

The ewes were fed lucerne hay and whole maize and dosed with iodinated casein in capsules. After 12 days' dosage, basal metabolism was again determined on fourth day of fast, the dosing continuing for the first three days. Basal metabolism was linearly related to dosage expressed as mg. per kg. $W^{0.73}$. Pulse rate was accelerated more strongly at high dosages (but was in linear relationship with metabolism). The effect on basal metabolism of the sheep suggests that stimulation of milk secretion in cows by iodinated casein is due to increased metabolism.—W. F. Syvret.

DISEASES, GENERAL

Henry, M. (1946.) **Some biological aspects of disease.**—*Yearb. Inst. Insp. Stk N.S.W.* 1946. pp. 21–39. **166**

The relationship between host and parasite is discussed with particular reference to the influence of environment. The argument is developed that disease is a manifestation of the lack of equilibrium between the host and the parasite. Where the equilibrium is most perfect the greatest difficulties arise in disease control, because of the "carrier" state. The policy of disease eradication by slaughter and protection by quarantine methods is more desirable, where applicable, than control by protective vaccination. The influence of nutrition upon infectious disease is still an open question. Dietetic diseases and diseases of malnutrition may also be regarded as failures in adjustment and result from the attempt to obtain more from the animal than it can produce efficiently on the available food. Nutritional diseases are more apparent in newly-settled countries, where the high carrying capacity of the virgin lands is exploited and is followed by rapid deterioration.—D. F. Stewart.

Fischer, A., Sellei, C., & Weisz, R. (1949.) **Studies on renal pathology.**—*Acta med. scand.* **133.** 394–405. [In English.] [Authors' summary copied *verbatim*.] **167**

The various views on the mechanism concerning the tubular reabsorption of a number of physiological substances are discussed. The renal mechanism of the water test is elucidated. The effect of the intravenous injection of several substances on renal function is examined and the use of NaH_2OP_4 shown to be the most suitable for a "dynamic" test of tubular function. Clearances and excretion indices have been determined in pathological conditions and the results in renal congestion and hypertension are discussed. Results

of clearance tests in renal insufficiency are reported. The characteristic decrease of tubular reabsorption in this condition is discussed. The applicability of Cushny's filtration-reabsorption theory on renal pathology is discussed with a suggestion for a possible alternative view of renal function. The practical use of clearance tests is summarized.

PINCUS, P. (1949.) **Production of dental caries. A new hypothesis.**—*Brit. med. J.* Aug. 13th, 358–362. **168**

P. formulates a new chemical theory, based upon the liberation of sulphatase by certain gram-negative bacilli found in caries. Sulphuric acid, released by this enzyme from enamel mucoprotein and chondroitin-sulphuric acid contained in dentine, converts the calcium salts of both enamel and dentine into less durable sulphates. The hypothesis is supported by histological, biochemical and bacteriological evidence.—E. F. L.

DIMOCK, W. W., BRUNER, D. W., & EDWARDS, P. R. (1948.) **Periodic ophthalmia of horses and mules.**—*Bull. Ky agric. Exp. Sta.* No. 512. pp. 1–35. **169**

Observations indicate that there are at least four types of irido-cyclitis with symptoms and lesions similar to " periodic ophthalmia ". Statistical studies of the case histories of 1,076 horses and mules revealed that 9% of these animals were affected with periodic ophthalmia. The condition was bilateral in 21·14% of cases, as compared with 8·44% in other eye diseases. In most cases periodic ophthalmia recurred within the first year and usually within the first month, the condition lasting for about 15 days. Susceptibility was greatest in 9-year-old animals.

In an experimental investigation of the disease, the authors failed to incriminate any bacterium or virus, or to transmit the disease either mechanically, or by artificial inoculation. The feeding of a diet deficient in Vitamin A produced negative results. The authors consider that there is no evidence of any hereditary factors in this disease.—E. F. LEWIS.

CHARLES, G. (1947.) **Chronic foreign body pneumonia : a peculiar case in a bull.**—*Yearb. Inst. Insp. Stk N.S.W.* 1947. pp. 67–68. **170**

A case of pneumonia in a stud Hereford bull is described. P.M. examination revealed the presence of masses of fine particles of chaff in the bronchi and bronchioles. The bull had been hand-fed with chaff during a very dry period.

—D. F. STEWART.

WILSON, W. W. (1949.) **Sheep husbandry.**—*Vet. Rec.* **61.** 567–571. **171**

Pregnancy toxaemia, milk fever, mineral deficiencies, helminthiasis, myiasis, and tick infestation are thought to be the most important problems confronting the sheep farmer at present. Anaerobic infections are so amenable to control that they have ceased to be of major importance. Improved management of the flocks, in conjunction with more general use of modern methods of disease control, could probably benefit the industry greatly.—G. B. S. HEATH.

SCHULZ, K. C. A., & MCINTYRE, C. (1948.) **Preliminary report on an infectious enterotoxaemia-like disease in sheep.**—*J. S. Afr. vet. med. Ass.* **19.** 93–99. **172**

An account is given of a fatal disease of Merino sheep, of undetermined aetiology, causing severe losses mainly amongst young stock in good condition, pastured on green crop such as wheat, oat or lucerne during late autumn and winter. Distribution is described as being fairly widespread. The similarity of the condition to ovine enterotoxaemia is stressed, although this could not be bacteriologically confirmed as the cause of death. The most striking features of the disease are nervous symptoms of cerebral origin, signs of intestinal disturbance, and rapid putrefaction and tympany of the carcass. Although the cause of the condition has not been definitely ascertained, a number of diseases such as poisoning caused by specific metallic and organic chemicals, plant poisoning, and well-recognized bacterial infections have, at this stage of the investigations, been excluded as likely causes. It is suggested that the signs of toxaemia observed may possibly arise from the absorption of a toxin of bacterial origin from the small intestine.—R. O. MUIR.

VENKATACHALAM, G., NELSON, R. H., THORP, F., Jr., LUECKE, R. W., & GRAY, M. L. (1949.) **Causes and certain factors affecting lamb mortality.**—*J. Anim. Sci.* **8.** 392–397. **173**

Principal causes of death were pneumonia, premature births, weak lambs, still-births, and external and internal abnormalities. Lambs with a birth weight much below the breed average had very little chance of survival. Of the 483 lambs studied, 138 (28·6%) died before reaching the age of two months, and of these, 71% died during the first two weeks of life.—G. B. S. HEATH.

THIERY, G. (1948.) Étude histologique d'un cas de porphyrie (ostéohémochromatose) chez un porc. [**Histology of a case of osteohaemochromatosis in a pig.**]—*Rec. Med. vet.* **124.** 145–152. **174**

A very detailed case report concluding with a brief speculation on the nature of the disease.

—L. M. MARKSON.

HOWIE, J. W., BIGGAR, W. A., THOMSEN, W., & COOK, R. (1949.) **An experimental study of pig rearing.**—*J. agric. Sci.* **39.** 110–118. **175**

Experiments were designed to investigate the superiority of outdoor, as compared with indoor rearing. Pigs were reared under varying housing conditions, with and without access to pasture and with and without iron supplements in the diet.

The data presented tend to support the view that unsuitable environment can be responsible for poor rearing results, that access to grass and turf does not in itself ensure healthy pigs, that iron deficiency anaemia does not in itself prevent good health and weight at weaning and that iron supplements in the diet will not prevent " unthriftiness " where pigs are poorly housed.

The pathological findings in the pigs that died were considered to be those of cardiac failure, but that iron deficiency was not necessarily associated with the heart failure. The significance of the high critical temperature of the pig in connexion with these changes is discussed.—D. Luke.

de Vanna, F. (1940.) Un caso di Acanthosis nigricans nel cane. **[A case of acanthosis nigricans in a dog.]**—*Nuova Vet.* **19.** 60–66. **176**

A clinical account of the treatment of a case with a mixture of endocrine products. The literature on acanthosis nigricans in dogs is discussed.

Ottaway, C. W. (1949.) **Patent foramen ovale in a puppy.**—*Vet. Rec.* **61.** 503–504. **177**

Recurring symptoms of severe dyspnoea led to clinical examination of a puppy when 35 days old. Diagnosis was confirmed P.M. The heart alone was abnormal and is illustrated and discussed anatomically. The author states that patency is not infrequent even in adult dogs, but that symptoms may be absent if the foramen valve is functioning. Symptoms arise only if anatomical occlusion is incomplete and accompanied by inability of this functional closure.—R. A. Green.

Ehrich, W. E., & Seifter, J. (1949.) **Thrombotic thrombopenic purpura caused by iodine. Report of a case.**—*Arch. Path.* **47.** 446–449. [Authors' summary copied *verbatim.*] **178**

A case of fatal thrombotic thrombopenic purpura following iodine medication is reported. It is suggested that the purpura was caused by an antigen-antibody reaction involving cells of the thrombocytic series. The involved cells agglutinated or disintegrated and occluded many capillaries. As a result the blood was depleted of thrombocytes and thrombopenic purpura ensued.

See also absts. **260**, **261**, **263** and **265** (books).

POISONS AND POISONING

Gorlenko, M. V. (1946.) **Toxins of moulds.**—*C. R. Acad. Sci. URSS.* **54.** 449–451. [Abst. in *Brit. Abstr.* A III. March. p. 316 of absts. (1949), copied *verbatim.*] Signed : W. McCartney. **179**

Skin and eye tests with rabbits show that similar water-insol. material (endotoxin), extracted from moulds (*e.g.*, *Stachybotrys alternans*) by organic solvents, is extremely toxic. The most toxic material is that obtained from *S. alternans* which, since other moulds are prevalent where it occurs, is probably not the only cause of stachybotriotoxicosis.

PHARMACOLOGY AND GENERAL THERAPEUTICS

(For treatment of specific infections see under the appropriate disease)

Gage, J. C., Martin, A. R., Rose, F. L., Spinks, A., & Tuey, G. A. P. (1947.) **2-*p*-aminobenzenesulphonamido-4 : 6-dimethoxypyrimidine : experimental evaluation.**—*Brit. J. Pharmacol.* **2.** 149–162. **180**

Searching for sulphonamides having a reduced toxicity and enhanced persistence in blood, the pharmacology of 2-*p*-aminobenzenesulphonamido-4 : 6-dimethoxypyrimidine was studied. Blood-concentration curves for species other than the mouse are given. The compound was given orally, as the sodium salt, using doses of 100 mg. per kg. for the dog, calf and sheep ; 150 mg. per kg. for the rabbit ; 200 mg. per kg. for the rat and chick. Maximum blood levels, reached in 2–8 hours, were : rat 11 mg. % ; chick 9 mg. % ; rabbit 6 mg. % ; sheep 8 mg. % ; calf 6 mg. % ; dog 2 mg. %. Bacteriostatic blood levels remained after 24 hours. The drug was non-toxic and somewhat more persistent than sulphadiazine, sulphamerazine or sulphamethazine.—M. Woodbine.

Dawson, J., & Dolby, D. E. (1947.) **The effect of calciferol on serum calcium and its relation to abnormal calcification.**—*Biochem. J.* **41.** pp. xlvii–xlviii of Proceedings. **181**

Changes in serum Ca were investigated in cases of lupus vulgaris which had been treated with calciferol. An increase in total serum Ca was observed, but it was not correlated with the dosage of vitamin D nor the appearance of toxic symptoms. The diffusible Ca was always markedly increased whenever toxic symptoms occurred. In the instances where ionic Ca was estimated, it

was within normal limits. Vitamin D therapy usually raised the serum protein and in certain cases the total serum Ca also, though not the diffusible Ca, probably because the rise in serum protein increased the amount of bound Ca and diminished the rise in diffusible Ca. Indications were obtained that in hypervitaminosis D part of the diffusible Ca was associated with a steroid component. In cases of Paget's disease, recently diagnosed, and in a case of massive arterial and arteriolar calcification the diffusible Ca was increased. This supports the view that some fraction of the diffusible Ca is intimately connected with calcification and that it is the component associated with steroid which is of importance.

—E. M. CRUICKSHANK.

ROVENSTINE, E. A., & PAPPER, E. M. (1949.) **The therapeutic role of procaine and its derivatives.**—*Bull. N.Y. Acad. Med.* **25.** 298–306. [Abst. from authors' summary.] **182**

Intravenous procaine is now popular therapy for many unrelated clinical conditions. It is used for analgesia, for vasodilatation, to depress cardiac irritability and for an anti-histamine effect. The mechanisms for this variety of activities are unknown. Some of those suggested are discussed. One of the metabolites of procaine, di-ethyl-amino-ethanol has been used experimentally and clinically as a substitute for the parent drug. The results obtained from these studies are outlined.

See also absts. **4-7** (mastitis) ; **8** (penicillin in anthrax) ; **22** and **23** (hormone therapy in TB.) ; **28** (BCG) ; **31** (antihistaminics) ; **41** (sheep pneumonia) ; **62** (streptomycin in actinomycosis) ; **77** (trypanosomiasis) ; **80** (trichomoniasis) ; **84** (avian coccidiosis) ; **85** (nivaquine, paludrine, metachloridine) ; **137** (nematodes) ; **152** (liver cirrhosis in rats) ; **262** and **265** (books).

PHYSIOLOGY, ANATOMY AND BIOCHEMISTRY

ALBERT, S., & LEBLOND, C. P. (1949.) **Age changes revealed by carbonyl reagents in tissue sections.**—*J. Anat.* **83.** 183–194. [Authors' summary copied *verbatim*.] **183**

The carbonyl reagents (fuchsin sulphurous acid and dinitrophenylhydrazine) were used as histochemical stains in a study of the tissues of 'A' and 'C57' mice taken at birth and at 1, 2–3, 8–9, 11, 15 and 16 months of age. The carbonyls detected in fresh and fixed tissues appear to be aldehydic lipids held in acetal linkage, presumably as 'plasmalogen'.

The histochemical reactions obtained with the two stains have the same distribution. They are present in almost all organs and tissues, but they are most intense in the steroid-secreting cells : adrenal cortex, interstitial cells of testis and ovary, corpus luteum. The staining intensity of kidney, endocrine glands, sex glands and accessory sex organs increases until puberty, is maintained during sexual maturity and subsequently decreases with increasing age. Frequently, the decrease or disappearance of the carbonyl reactions is accompanied by pigment degeneration, especially in the steroid-secreting cells. The parallel existing between the staining with carbonyl reagents and the physiological level of activity suggests the use of these as tests of function. Some caution is, however, necessary in the interpretation of the results.

REGGIANI, E. (1940.) Ricerche sulla tunica muscolare del condotto deferente dell'uomo e dei mammiferi. **[The muscular coat of the vas deferens in man and mammals.]**—*Nuova Vet.* **18.** 277–281. **184**

Sixty specimens of vasa deferentia from 28 species of mammals were examined by routine histological techniques. Two tables are included giving the calibre of the lumen, thickness of mucosa, submucosa, internal and external muscular layers and, where present, the number and height of mucosal papillae, in the scrotal and abdominal regions respectively.

An inner circular and outer longitudinal layer are distinguished in all animals. In the larger ones there is also a thin discontinuous layer immediately beneath the mucosa ; these fibres are practically longitudinal.—W. PLOWRIGHT.

GROSS, J. (1949.) **The structure of elastic tissue as studied with the electron microscope.**—*J. exp. Med.* **89.** 699–708. [Author's summary copied *verbatim*.] **185**

Electron microscope examination of fragmented elastic tissue obtained from fish swim bladder, bovine ligamentum nuchae, and aortas of various mammals, including man, reveals characteristically formed fibers and much amorphous material. Boiling in dilute acid destroys the associated collagen but does not obviously alter the elastic tissue.

Digestion in crystalline trypsin of either boiled or unheated tissue from any of the above-mentioned sources causes the release of thin threads ranging in length from 0·1μ to many microns. A large proportion of these threads are evenly and tightly coiled double helices formed from at least two interlacing filaments and measuring about 120 A in width. The distance between coils ranges from about 470 to 590 A. The individual smooth filaments, many of which are present in parallel pairs, measure approximately 70 A in width.

Raising the pH of a neutral suspension of threads from ligamentum nuchae lowers the ratio

of helical threads to uncoiled filaments, whereas lowering the pH with acetic acid results in clumping of threads with complete loss of identity at about pH 3·6. Threads and filaments obtained from all sources studied were destroyed in the temperature range 75–85° C. at pH 7.

It is concluded that the elastic fiber is a two component system composed of bundles of trypsin-resistant threads of characteristic form and size plus a trypsin-sensitive, heat-resistant "amorphous" binding matrix. The possible relationship of this structure to the elastic properties of the tissue is discussed.

LALL, H. K. (1948.) **Dentition in Indian cattle.**—*Indian J. vet. Sci.* **18.** 37–39. **186**

In observations made on eleven important Indian breeds of cattle it was found that they completed their permanent dentition between four and a half and five years of age. Details of the eruption of the various teeth in Hariana cattle from one month to six years and a comparison of the permanent dentition of imported breeds with that of Indian cattle are tabulated. No sex variation was noticed in Indian cattle.

The dentition in buffaloes is similar to that of cattle but there are certain peculiarities by which their age can be correctly judged up to the eighth year.—M. K. SREENIVASAN.

KAY, H. D. (1947.) **Lactation: function and product. Biochemistry of milk secretion.**—*Brit. med. Bull.* **5.** 149–154. **187**

In this general review of milk secretion, it is pointed out that the mammary gland is capable of both the synthesis and concentration of milk and is continually active as is seen from the large and continuous utilization of oxygen by the gland. The large cuboid cells lining each alveolus are responsible for secreting all the constituents of the milk which must, therefore, be regarded as an extruded, intracellular secretion.

Milk secretion has mainly been studied by means of observations on arterio-venous exchanges, perfusion of the gland, mammary slices and more recently by means of isotopes such as C^{13}. The main findings are that the rate of blood flow through the gland is very rapid, up to 6–7 litres per min. in a good cow and that the R.Q. usually exceeds 1 in both the cow and the goat. As far as synthesis is concerned, lactose is produced from blood glucose but it is not clear whether blood glucose is used for other purposes as well. Neutral fat is also taken up from the blood, but milk fat which contains some 30% of short-chain fatty acids could not be produced merely by concentrating the neutral blood fat and the mechanism of its synthesis is still obscure. The quantity of amino-acid taken up from the blood accounts only for a very small fraction of the total milk protein. There is, however, evidence that one of the blood globulins, a glycoprotein, may provide material for the synthesis of the milk proteins. Finally, citric acid which only occurs in traces in the blood is present to the extent of 0·2% in cow's milk. There is good evidence that mammary gland tissue can synthesize citric acid from various substances, *e.g.* glucose, pyruvic acid, glycogen, etc.—J. A. N.

PARRISH, D. B., WISE, G. H., & HUGHES, J. S. (1947.) **Properties of the colostrum of the dairy cow. I. Tocopherol levels in the colostrum and in the early milk.**—*J. Dairy Sci.* **30.** 849–860. **188**

Cows of four breeds were fed on a normal winter ration or on this ration supplemented daily during the last month of gestation with mixed tocopherols. Some of the animals received vitamin A in addition. The first sample of colostrum was usually taken within two hours of calving; subsequent samples were taken at frequent intervals up to the eighth day. Maximum values for tocopherol were obtained at the first or second milking; by the eighth day the values had fallen to about one-ninth of the initial level. Fat from the colostrum of cows receiving no tocopherol, 0·5–1 mg. or 10 mg. of tocopherols daily contained on the average 98 μg., 150 μg. and 489 μg. per g., respectively. It is calculated that a calf suckled by a cow on normal rations obtains 22–86 mg. of tocopherols in the first four days of life. A calf suckled by a cow dosed with 10 mg. tocopherols daily, will receive five times as much. The concentration of tocopherols in the milk was not affected by the administration of vitamin A nor by breed differences.—E. M. CRUICKSHANK.

VANLANDINGHAM, A. H., WEAKLEY, C. E., Jr., ACKERMAN, R. A., & HYATT, G., Jr. (1949.) **The relationship of production of heifers milked prepartum to the composition of colostrum.**—*J. Dairy Sci.* **32.** 559–564. **189**

Sixteen first-calf Ayrshire heifers were divided into two groups according to their expected calving dates, and the heifers in one group were milked by machine for about two weeks before calving. Milking was carried out once daily until production increased to 2 lb., after which they were milked twice daily and samples were taken for analysis. After parturition they were milked twice a day and samples were taken, the calves remaining with their dams for the first three days.

Total production before parturition varied from 2 to 142 lb., and the yield on the day before parturition from 0·1 to 24·3 lb. The number of days milked *pre partum* was not a determining factor. Much greater variation existed in the

composition of the milk of the heifers which had been milked, and the total nitrogen, non-casein nitrogen and the percentage of non-casein nitrogen of the total nitrogen was much higher for the milked heifers than for the unmilked.

In the unmilked group the total nitrogen and the non-casein nitrogen content showed that true milk production commenced on the fourth day after calving, but of four heifers in the milked group tested, one produced normal milk three days before parturition, another one day before calving, a third on the second day after calving, and a fourth at the normal time. Of the eight calves in this group only two failed to receive any colostrum, but all were given 25 ml. of cod-liver oil on the day of birth and all grew well.

No conclusions are drawn as to the effect of *pre-partum* milking on the udder condition.

—J. O. L. KING.

BOSTROM, L. (1948.) **Are non-nucleated erythrocytes formed by budding off of cytoplasm from normoblasts.**—*Acta med. scand.* **131.** 303–324. [Author's summary slightly modified.] **190**

The author presents a hypothesis, originally based on observations in circulating blood, that the red blood corpuscles are formed by the budding off of hemoglobin-holding cytoplasm from the erythroblasts in the marrow, not by denucleation as formerly believed. According to her hypothesis, one erythroblast can form several erythrocytes. The stalk-like process often seen on the edge of a poikilocyte is assumed to be a malformation caused by the cell's passage through a thickened sinusoid wall. This deformity reveals something of the mechanism of erythropoiesis.

The budding hypothesis is supported by the following facts :– The erythroblasts of the marrow are not sufficient for the enormous amount of erythrocytes required each day, if as according to the denucleation theories, one erythroblast can only form one erythrocyte. The figures tally better if each erythroblast is assumed to form several erythrocytes. It has been impossible to explain what becomes of all the "extruded" nuclei. The budding hypothesis explains why one sees only normally sized nuclei, if any at all. Excentrically situated nuclei and "extrusion" figures can be explained as phenomena occurring during the process of budding. The puzzling problem of the manner in which the erythrocytes leave the parenchyma of the bone marrow solves itself despite the fact that the vascular system is closed. The contrary observations of Sabin and Turnbull are explained when it is assumed that the first phase of erythropoiesis takes place extravascularly and the second phase intravascularly. Anisocytosis is explained as due to the detachment of differently sized pieces of protoplasm. The reticulocytes fit nicely into the budding hypothesis. The most immature have a distinctive shape which is easily observed in living blood. The name proerythrocyte is suggested for this cell. The cytoplasm of normoblasts in normal marrow looks exactly the same as that of proerythrocytes. Both are polychromatophil. Budding off of protoplasm from normoblasts is a common observation in intense erythropoiesis. Several photomicrographs showing the budding off of a blood corpuscle are included. Normoblasts with a giant cytoplasm are evidence that a normoblast is able to form more than one blood corpuscle. Capillary movements according to Doan may be assumed to be the direct cause of the transport of the cells away from the parenchyma of the bone marrow. Nuclear movements may be interpreted as a sign of intense erythropoiesis. An alternation between "systole" and "diastole" explains the sometimes densely and sometimes loosely packed nuclei. Nuclear threads between erythroblasts have been demonstrated in the marrow with abnormal erythropoiesis. Normoblasts with satellite granules have also been seen. Cabot's ring bodies and Howell-Jolly bodies may be explained by the incorporation of these abnormal structures in the detached "pseudopod". Embryonic studies in rats by Jacobsen and Plum have shown that there is a separation between the nucleus and cytoplasm of the normoblast. They calculated that ten to a hundred non-nucleated erythrocytes per normoblast are formed each day. Bone marrow cultures in vitro by Plum have shown that every erythroblast gives rise to about fifty erythrocytes per day. He observed the budding off of cytoplasm in cultures in a counting chamber and was able to film the course of events.

SALTZMAN, G.-F. (1949.) **A contribution to the question of the possible phagocytic ability of the megakaryocytes.**—*Acta path. microbiol. scand.* **26.** 418–428. [In English. Author's summary copied *verbatim*.] **191**

After a review of the attitude of recent investigators to the question of the possible phagocytic ability of the megakaryocytes an account is given of studies of these cells in native preparations from bone marrow, principally with dark-ground illumination. These observations verify that the megakaryocytes do not possess phagocytic ability but that the pictures which have been interpreted in favour of this property, are conditioned by a tendency of the mobile white corpuscles to accumulate about the giant cells. The reason why the leukocytes are driven in this manner towards the megakaryocytes cannot be determined. The problem in its whole extent will apparently not be finally solved until it

becomes possible to study bone-marrow cultures under wholly physiologic conditions.

JACOBSEN, E., & PLUM, C. M. (1948.) **The effect of gastrectomy on the blood picture and on the ripening index of reticulocytes in rats.**—*Acta med. scand.* Suppl. no. 213. pp. 209–220. [In English. Authors' summary slightly modified.] **192**

The authors found the following abnormalities in rats after gastrectomy: (1) a microcytic anaemia, (2) a reticulocytosis, (3) an iron deficiency, (4) a decreased content of reticulocyte ripening factors in the plasma. As it was possible to improve the anaemia with iron without any influence on the ripening factors and to restore normal values of ripening factors without any influence on the anaemia, they concluded that these symptoms occur independently of each other.

BORCH-MADSEN, P., & OHLSEN, A. S. (1948.) **On the effect of total resection of the fundus ventriculi in thriving swine upon the anti-anemic factor content of the liver.**—*Acta med. scand.* Suppl. no. 213. pp. 91–98. [In English. Abst. from authors' summary.] **193**

Two patients suffering from pernicious anaemia were treated with "hepsol", prepared from the liver of pigs in which total fundectomy had previously been performed. In the first patient a diffuse and weak dosage of the "hepsol" resulted in a moderate rise in the reticulocyte count. In the second patient a more concentrated dosage was followed by a sufficient rise in the reticulocyte count, but lack of "hepsol" material precluded any continuous treatment with this substance.

The authors concluded that the fundus portion of the pig's stomach is of no significance in the formation of the anti-pernicious anaemia principle in the liver.

PÁLOS, L. A. (1949.) **Respiration and blood-coagulation.**—*Acta med. scand.* **134.** 221–224. [In English. Author's summary slightly amended.] **194**

It has been observed that the clotting of the circulating blood is regulated by the respiration. Thrombin is more readily inactivated by arterial than by venous blood and therefore the clotting process of the arterial blood is less effective. Hyperventilation results in an increase of the ability to inactivate thrombin and the clotting capacity of the venous blood. According to earlier observations the respiration effect is considered to be due to a change of the oxygen metabolism and to the resulting change of the thrombin-inactivating power of the blood.

SCHUMMER, A. (1949.) Zirkulationsfördernde Einrichtungen am Zehenendorgan des Pferdes. **[Capillary circulation in the hoof of horses.]**—*Dtsch. tierärztl. Wschr.* **56.** 36–38. **195**

S. briefly discusses physiological and clinical evidence for arterio-venous anastomoses before examining their occurrence in the corium of the foot of the horse. Corrosion sections of the foot injected with "plastoid", according to the author's special technique, were examined in both macroscopic and microscopic views. Direct arterio-venous connections in the papillary vessels of the wall, sole and heel bulbs were found and these vessels were surrounded by an even finer network of capillary vessels. The findings are considered in the light of the mechanism of the hoof and venous return, and are demonstrated as an arrangement designed for the special functional requirements of this region.—C. W. OTTAWAY.

O'NEIL, J. B., JOWSEY, J. R., LEE, C. C., & SPINKS, J. W. T. (1949.) **Distribution of P^{32} in chick embryos.**—*Canad. J. Res.* Sect. D. **27.** 223–232. [Authors' abst. copied *verbatim.*] **196**

By feeding a hen repeated daily doses of sodium dihydrogen phosphate of equal P^{32} activity, eggs with high and nearly uniform P^{32} content were obtained for use in hatching experiments. Eleven eggs were incubated. The embryos and chicks that died during or after incubation were dissected and analyzed for total and specific activities in the various fractions. Two of the chicks, both females, are still living. They are being raised so that observations may be made on their ability to reproduce and the effect of the radioactivity, if any, on their offspring.

ELIAS, H. (1948.) **Growth of the adrenal cortex in domesticated ungulata.**—*Amer. J. vet. Res.* **9.** 178–189. **197**

E. confirmed the view of several workers that cells of the adrenal cortex are replaced by morphogenesis of undifferentiated cells of the cortex. In so doing he discussed and illustrated several different modes of growth and gave a description of the cortex of the horse, ox, pig, goat and sheep. Methods varying from a gradual transformation of individual or small groups of cells, as seen in the sheep, to the prior formation of cortical nodules, as seen in the horse, are described. In this latter instance a nodule with zona arcuata and contained zona fasciculata is first formed, the nodule capsule perforates and the zona arcuata is incorporated within the general cortex, to be followed by the denuded zona fasciculata passing into the substance of the gland. The cortex of the horse and pig is described as possessing typical zona arcuata, the goat and ox a zona glomerulosa, while in the sheep no evidence of a distinct zona glomerulosa or zona arcuata was found.

Only a limited number of specimens (2 horse, 3 calf, 3 pig, 2 goat and 3 lamb) were used for these observations, but E. stresses the importance of examining serial sections.—C. W. Ottaway.

Schultze, A. B., & Turner, C. W. (1945.) **The determination of the rate of thyroxine secretion by certain domestic animals.**—*Res. Bull. Mo. agric. Exp. Sta.* No. 392. pp. 89. **198**

The authors discuss the literature, giving some 159 references, concerning the thyroid in metabolism together with the effects of goitrogenic substances and interpolate the results of their own investigations in this field.

The normal regulatory mechanism of thyroid activity is discussed and the relative importance of various criteria of thyroid activity such as iodine content, thyroid weight, the histology of the organ, and blood iodine are evaluated. The controlling effects of the anterior pituitary, environment (diet, season, temperature), and age on the activity of the thyroid are discussed and the various factors affecting thyroid hormone secretion rate are shown in a diagram. The production of goitrogenic effects by substances which can be prevented by increased iodine administration is commented upon but the nature of the action of goitrogenic compounds which cannot be prevented by increased iodine intake receives special treatment.

The optimal goitrogenic effects of thiouracil were determined for various species. In chicks of various ages the addition of 0·1% thiouracil to the diet resulted in maximum thyroid enlargement. The effects were not uniform in all fowls, being greater in the female than the male, and in the lighter breeds than in the heavier breeds, in younger chicks than in older chicks, in castrated chicks than in normal chicks. In some chicks the addition of the dimethyl ester of di-ethylstilboestrol enhanced the goitrogenic effects of thiouracil while in pullets the goitrogenic effects were reduced. In chicks in good physical condition and growing condition the goitrogenic effect of thiouracil was greater than in comparable groups in poor physical condition. Thiourea produces goitrogenic effects at a lower dosage level than thiouracil, but is much more toxic.

The rate of secretion of the thyroid in White Leghorn cockerels varies between 2·76 μg. d.l.-thyroxin per 100 g. body weight per day at two weeks and 1·63 μg. per 100 g. body weight at 27 weeks of age. In White Plymouth Rocks the rate of secretion of d.l.-thyroxin is less than in the White Leghorn. The secretion rate in pullets is slightly higher and in castrated cockerels 16% less than that of normal cockerels under similar experimental conditions.

In the growing goat 180 μg. d.l.-thyroxin was secreted per goat per day at two months (weight 22 lb.) which increased to 640 μg. per day at a body weight of 45 lb. and to 930 μg. at a body weight of 76 lb. Lactating goats producing 2·6 lb. of milk per day had a thyroid secretion rate of 1,425 μg. of d.l.-thyroxin per animal per day, which fell to 1,000 μg. per animal per day when the milk yield fell to 1·8 lb. per day. A limited number of experiments were done on cattle to assess the thyroxin secretion rate and the results indicated similar values to those obtained in the goat.

The foetuses of mid-term pregnant goats had marked thyroid enlargement when the dam was treated with thiourea or thiouracil, but no reaction if the pregnancy was prior to mid-term. Since the thyrotropic hormone of the dam cannot pass the placental barrier then the time when the foetal thyroid is affected by goitrogenic substances (*i.e.*, mid-term) may indicate the onset of pituitary and thyroid function.

In two cows in which the administration of thiourea had caused depression of milk yield the administration of 10 mg. d.l.-thyroxin per day restored milk production to 87% and 96% of normal.

The authors consider that in those productive processes associated with hyperfunction of the thyroid, performance could possibly be increased by the administration of thyroidally active compounds and, conversely, in the productive processes associated with hypofunction of the thyroid a non-toxic anti-thyroid substance such as thiouracil might be given with benefit.—F. R. B.

Nickel, R. (1949.) Anordnung des Zwischenhorns in Trachte und Eckstrebe der Hufplatte. [**Structure of the horse's hoof.**]—*Dtsch. tierärztl. Wschr.* **56.** 34–36. **199**

The arrangement of the horn striae and connecting units in the superficial and deep portions of the toe and quarters of the hoof were examined microscopically by polarized light in order to relate information to the weight bearing properties of different areas. Two schematic drawings indicate the main findings.—C. W. Ottaway.

Ter Borg, H. (1941.) **The atrio-ventricular conduction-system of the big domestic animals, and, more especially on the terminal arborisation of the Purkinje-fibres and the so-called inter-ventricular connections.**—*Acta neerland. morphol. Norm. path.* **4.** 97–120. **200**

Following injection of the channel spaces accompanying the Purkinje fibres in the heart of the horse and ox with Gerota's fluid and subsequent clearing of the heart by the Spalteholz transparency method, the author studied the extensions of the Purkinje-network.

With this new technique he was able to demonstrate the topography of the atrio-ventricular (Tawara's) node and subjoined bundle of His. The crus sinistrum of this bundle divides into three branches, one passing into the terminal network of the septum halfway down the wall, the other two into the parietal network, *via* musculus transversi (moderator bands) and the papillary musculature. The crus dextrum passes throughout its course along the septal wall without branching, to transit, *via* the trabecula septomarginalis and base of the parietal papillary muscle, into the parietal wall. The extensions of these Purkinje fibres demonstrate no separate right and left series; the parietal walls were pervaded by one great terminal network and "interventricular" connections through the septal wall were found greatly in excess of previous findings. The results were checked by microscopic examination and many figures illustrate the main findings.

—C. W. Ottaway.

Dunn, T. B. (1949.) **Some observations on the normal and pathologic anatomy of the kidney of the mouse.**—*J. Nat. Cancer Inst.* **9.** 285–301. [Author's summary copied *verbatim.*] **201**

From a review of the literature and unpublished observations made at the National Cancer Institute, the following information concerning the kidney of the mouse is presented.

The kidney of the mouse is similar to the kidney of the rat in general architecture and the arrangement of parts of the nephron into well-defined zones. Granular cells of the preglomerular apparatus are easily demonstrated, particularly after treatment by the periodic-acid technique. In comparison with the kidney of other mammals, the mouse kidney has a small amount of glomerular tissue in relation to kidney weight and body weight. A sex difference is detectable in the kidney of the mouse. Morphologically, this consists in a higher ratio in the male of glomeruli lined by cuboidal epithelium. A difference in the distribution of alkaline phosphatase can also be demonstrated. Congenital anomalies are infrequent. Absence of one or both kidneys, polycystic kidneys, and hydronephrosis are reported in association with other defects. Embryologic studies of the development of these anomalies are reported.

The sex of the animal affects the development of pathologic processes in the mouse. Examples are the relative resistance of females to chloroform poisoning and a difference in the location of calcium deposits in the kidney in strain C3H mice.

Infestation by *Klossiella muris* is frequent in some laboratories. This organism produces little if any inflammatory reaction or clinical manifestation of disease.

Iron deposition may be seen in the cells of the proximal convoluted tubules, when the glomerular threshold is exceeded by an iron compound in the blood, or when there is damage to the kidney glomerulus and a lowering of the normal threshold. Renal lesions accompanying a generalized amyloidosis are frequently encountered in certain inbred strains. This lesion is similar in many histologic features to chronic pyelonephritis in man. A lesion diagnosed as spontaneous glomerulonephritis is reported. Renal lesions were produced in two inbred strains of mice treated with urethan. Primary neoplasms of the kidney are extraordinarily rare in the mouse. No report on the successful induction of tumors reproducing the types which occur spontaneously has been found.

See also absts. **74** (carbohydrate metabolism in trypanosomiasis); **213** (laying hens); **244** (microscopy of living tissue and splenic circulation); **264** (book on clinical biochemistry).

PUBLIC HEALTH, VETERINARY SERVICES AND VETERINARY EDUCATION

I. Callow, E. H. (1949.) **Science in the imported meat industry. Part I. General.**—*J. R. sanit. Inst.* **69.** 35–39. **202**

II. Ingram, M. (1949.) **Science in the imported meat industry. Part II. Hygiene and storage.**—*Ibid.* 39–47. **203**

I. Fattening an animal reduces the percentage of water in the carcass and so improves its keeping qualities, but should not be carried too far, as the protein percentage is also reduced. Transport of live animals from farm to abattoir causes considerable depreciation in quality, this being most noticeable in pigs, in which it may amount to 2 lb. per head per day in transit. In sheep there is less depreciation and in cattle least of all. The most important factor in the keeping quality of meat is the acidity developed during rigor mortis, and this is dependent on the glycogen content of the muscle. Hence the importance of a long rest, with feed if necessary, before slaughter. In acid meat the muscle fibres open up, allowing salt and sugar to penetrate and moisture to evaporate; but such meat will actually be rather tougher than the less porous alkaline meat which retains its moisture. A good covering of fat will help to retain the moisture in porous acid meat, but increases the risk of tainting by rancidity.

II. In preparing meat for storage under chilled but not frozen conditions, it is vitally important that the initial contamination shall be small. Apart from the migration of organisms from the gut to the blood stream, others can be introduced by dirty knives or even stunning bolts; but with scrupulous cleanliness during slaughter,

losses from such causes can be reduced to a minimum. More troublesome are the organisms which develop at low temperatures that are capable of forming slimes on the surfaces even at freezing point. As these are less common in tropical climates, it follows that the best chilled meat comes from the warmer zones, of Australia for example. Slime can also be reduced by keeping surfaces dry by good ventilation or by the use of gases, of which the author favours 15–20% CO_2. Ozone can also be recommended but is rather apt to cause rancidity in fat. Factory killed pigs generally have a lower acidity than farm killed, and so will not keep so well. Even the best meat from hygienically killed animals cannot be kept in chill rooms for more than ten weeks. If longer storage is required the meat must be frozen or canned.—R. MACGREGOR.

SERGENT, G. (1949.) Numération microbienne et récolte hygiénique du sang battu dans les abattoirs. **[Bacterial content of blood collected at abattoirs.]**—*Rec. Méd. vét.* **125.** 118–126. **204**

In bacterial counts of blood obtained in the abattoirs and during subsequent treatment there were found to be wide variations that could not be related to any particular care or neglect of hygienic precautions. S. claims that the foam formed on the surface during whipping and removal of fibrin has an agglutinating effect, since blood from just below the foam yielded a fairly regular count, whatever the conditions of handling and storing. It is essential, however, not to allow the samples or apparatus to be contaminated with foam, as this has a high but irregular bacterial content.—R. MACGREGOR.

FABIAN, F. W. (1947.) **Cheese and its relation to disease.**—*Amer. J. publ. Hlth.* **37.** 987–996. **205**

Since 1883 there had been 59 epidemics causing 2,904 cases of disease and 117 deaths in the U.S.A. and Canada due to cheese-borne organisms. Most of these organisms were of the *Salmonella* type, but some cases of *Brucella melitensis* infection occurred. Most pathogens die out if the cheese is kept for 6–8 months; but in the case of the Cheddar type of hard cheeses it is better to use pasteurized milk, which has the additional advantage of enabling the cheese to ripen in 2–3 months, using a higher temperature more fatal to pathogens. Most States of the U.S.A. and Canada enforce this law.

—R. MACGREGOR.

DAVIS, D. E., & FALES, W. T. (1949.) **The distribution of rats in Baltimore, Maryland.**—*Amer. J. Hyg.* **49.** 247–254. [Authors' summary copied *verbatim*.] **206**

A method of estimating populations of brown rats (*Rattus norvegicus*) by means of signs permits an estimate of the number of rats in Baltimore, Md. In September, 1947, the number of rats in a random sample of 359 blocks in the residential part of the city was estimated and the number of rats in the city calculated on the basis of rats per dwelling unit. This computation gives 139,855 rats, with a range ($\pm 2 \times$ standard error) of 119,000 to 158,000. On the basis of other sources of information an estimate of 26,000 rats in the commercial areas was made. A map of rat population according to census tracts agrees closely with the distribution of buildings in need of major repairs.

PARRY, M. T. (1948.) **Suggested amendments to the livestock (Restriction on slaughtering) (No. 2) order, 1940.**—*J. R. sanit. Inst.* **68.** 323–328. **207**

The weaknesses of the present Restriction on Slaughtering Order (No. 2) are: that animals rejected at one grading centre can be hawked round the country in the hope of finding a less strict grader; and that no factual evidence is required for "emergency slaughter". The sale of knackers' meat is practically unregulated and P. states that it is often used as human food. He suggests that rejected stock should be removed compulsorily to an approved knackery, or to recognized graziers who could and would try to improve the condition of the animals; that no permit for emergency slaughter be issued except when a veterinary surgeon certifies the need, or there is obvious evidence of injury. All knackers' meat should be thoroughly cooked.

—R. MACGREGOR.

GADOLA, A. (1948.) La zootecnia e la veterinaria in Africa orientale. **[The Veterinary service in East Africa.]**—*Zootec. Vet., Milan.* **3.** 163–165. **208**

The economic and political importance of the veterinary services in ex-Italian East Africa is stressed. The introduction of European breeds of domestic animals receives a brief mention.

—W. PLOWRIGHT.

See also absts. **37** (milk-borne diphtheria); **239** and **240** (bacterial count in milk); **253-256** (India); **267** (textbook of meat inspection).

LIVESTOCK HYGIENE

BARTOS, D., BÁNSÁGI, J., & BAKOS, K. (1947.) Die Lebensdauer der enteralen krankheitserregenden Bakterien im Brunnenwasser. **[The survival of pathogenic intestinal bacteria in well water.]**—*Z. Hyg. InfektKr.* **127.** 347–354. [Abst. in *Bull. Hyg., Lond.* **24.** 268. (1949),

copied *verbatim.* Signed: A. J. H. Tomlinson.] **209**

Small shallow cement-lined wells were sunk in a sandy gravel soil and infected with large numbers of organisms of the enteric and dysentery groups. No evidence of multiplication was found and the numbers of organisms fell rapidly. Cultures made from the mud at the bottom of the wells remained positive for periods up to 45 days from the date of infection: these cultures proved to be more sensitive in detecting the infecting agent than cultures made from the pad of Seitz filter through which a large volume of water had been passed.

Newton, W. L., Bennett, H. J., & Figgat, W. B. (1949.) **Observations on the effects of various sewage treatment processes upon eggs of *Taenia saginata*.** — *Amer. J. Hyg.* **49.** 166–175. [Authors' summary and conclusions copied *verbatim.*] **210**

Experiments were set up for the evaluation of the effects of various sewage treatment processes upon eggs of *Taenia saginata.* The results and observations obtained before the limited supply of material was exhausted, are presented.

Twenty experiments were performed to observe the settling characteristics of *T. saginata* eggs in an 18-inch column of raw sewage. The settling rates obtained were as follows: 65 per cent of the eggs, 0·6 inch per minute or faster; 16 per cent, 0·3 to 0·6 inch per minute; and 17 per cent, 0·15 to 0·3 inch per minute. These results indicate that sedimentation of raw sewage with moderate overflow rates and for 1-to-2-hour detention periods would remove the majority of the eggs. However, even under optimal conditions a significant percentage of influent eggs would escape with the effluent.

Seven experiments were conducted with the sand filtration process. A 12-inch column of sand, 0·5-millimeter effective size, was used. The filtration rate was 1,000,000 gallons per acre per day, and influents contained 50,000 to 200,000 *T. saginata* eggs. The failure to recover eggs in the effluents, with one exception (0·4 per cent recovery), at this extreme of operational conditions indicates that the process would be a very effective method of checking the spread of *Taenia* eggs in primary effluent.

On the basis of the results obtained from two digesting sludge experiments still in progress, it would appear that this process is very slow in destroying *T. saginata* eggs. While there has been an obvious deterioration of many of the eggs, apparently normal eggs have been recovered from sludge after 6 months of digestion at 75 to 85 F.

Two experiments were performed with a laboratory-model trickling filter operated at rather slow rates. Recoveries of 30 and 38 per cent of influent eggs suggested that this process would not provide adequate protection against an effluent contaminated with *Taenia* eggs.

One experiment with the activated sludge process still in progress indicates that this process would have little effect upon *T. saginata* eggs. After 5 months of aeration, there has been no noticeable effect upon the eggs as determined by microscopic examination.

The results of these experiments indicate that, if sewage were contaminated with *Taenia saginata* eggs, the usual treatment processes (with the exception of sand filtration) could not be relied upon to produce effluent or sludge free of viable eggs.

I. Moore, H. I. (1948.) **Ley farming.**—*Vet. Rec.* **60.** 406–407. **211**

II. Smythe, R. H. (1948.) **Ley farming.**—*Ibid.* 407–410. **212**

I. The differences between a permanent and a ley pasture are described and the reasons for the extension of ley pastures in England in recent years discussed. The effects of ley pastures on the health of cattle are then reviewed. The incidence of bloat on such pastures is high and the possible advantage of a proportion of weeds in the pasture is suggested.

II. S. deals with the veterinary aspects of ley pastures. He considers that weeds in grass land have a value and possibly supply some essential elements not present in grass. Concentration of stock on leys is important in connexion with parasitic infections and Johne's disease. Improvement of patches of pasture on hill grazing may lead to over concentration and increase the incidence of strongylosis. Acid soils are favourable to the development of Johne's disease. Hypocalcaemia and hypomagnesaemia occur more readily on ley pastures than on permanent pastures.

There are two types of bloat: a rapidly developed type which is anaphylactic in origin and a less acute, "frothy" type caused by fermentation of stalky indigestible fodder.—M. C.

See also absts. **171** (sheep husbandry); **175** (pig rearing).

REPRODUCTION AND REPRODUCTIVE DISORDERS

Goodale, H. D. (1949.) **Increasing the efficiency of the laying hen.**—*Science.* **110.** 46–47. **213**

G. discusses the progress made in a poultry flock since 1923 by the consistent use of the family method of breeding. Pairs of parents are judged by the performance of all their progeny. Egg

weight increased from 1·85 oz. in 1923 to 2·30 oz. in 1946, while during the same period average egg production in pullets increased from 168 to 237. At the same time total mortality decreased from 45·4% to 18·5%.—D. LUKE.

SANFILE, V. (1948.) La fecondazione artificiale nei bovini—Metodica e dati sulla incidenza di fecondità. [**Artificial insemination of cattle. Methods used and incidence of fertility.**]—*Zooprofilassi.* **3.** No. 3. pp. 12–19. **214**

At the institute for artificial insemination and sterility control in Rome 173 cows were artificially inseminated over a period of 12 months. Out of 80 healthy cows 76 became pregnant and out of 93 cows which had previously undergone sterility treatment 80 became pregnant. Gestation and parturition were normal. The percentage of males born was 43%. Semen from four bulls of imported Friesian and Brown Swiss stock and from one locally bred from a Dutch breed was used.

No new information about the methods used is given.—E. G.

DRACY, A. E., & PETERSEN, W. E. (1949.) **Recovery of the fertilized ovum from the living cow.**—[Abst. from abst. in *J. Dairy Sci.* **32.** 726.] **215**

A technique has been developed whereby the fertilized ovum can be flushed out of the uterus of the living cow without surgical intervention. The cow is inseminated when in oestrus and the ovum recovered on the seventh day, when it has descended the Fallopian tube and has not yet commenced nidation.

Instruments have been developed to facilitate entrance through the cervix. These consist of a 5/16 inch stainless steel probe with a tight fitting cannula. The probe is first inserted through the cervix. This is accomplished by grasping the cervix by one hand in the rectum while the other hand is used for traction and manipulation of the probe. After penetration by the probe the cannula can easily be slipped over the probe through the cervix, the probe being then removed. A small Koreseal tube is passed through the cannula to the tip of the uterine horn on the side where ovulation has taken place. Its course through the uterus can be guided manually from the rectum. Approximately 1 l. of flushing fluid (physiological saline) is forced as rapidly as possible through the tube and the fluid caught in a separatory funnel from the cannula. The material is permitted to stand in the separatory funnel for 15–20 min. when a few ml. of solution are withdrawn and observed under a 15–25 power dissecting microscope. The French type of separatory funnel has been found superior to the ordinary kind. The fertilized ovum readily gravitates to the bottom of physiological saline solution but will often adhere to mucous material that may stick to the walls of ordinary separatory funnels.

While there is great variation in the ease with which entrance through the cervix may be effected, in typical cases the whole procedure in flushing out the uterus need not exceed 10 min.

AMOROSO, E. C., & PARKES, A. S. (1947.) **Effects on embryonic development of X-irradiation of rabbit spermatozoa** *in vitro.*—*Proc. roy. Soc.* Ser. B. **134.** 57–78. [Authors' summary copied *verbatim.*] **216**

Rabbits in which ovulation was induced artificially were inseminated with spermatozoa exposed *in vitro* to doses of X-rays varying from 50–100,000 r. Exposure of the spermatozoa to 50 and 100 r did not interfere with fertilization, segmentation of the ovum or embryonic and foetal development, and apparently normal young were born at term. With doses of 250, 500 and 1,000 r, an increasing proportion of the tubal ova obtained about 40 hr. after ovulation showed arrest of segmentation. With 500 r. the incidence of established pregnancy and litter size were reduced, but some, not obviously abnormal, young were obtained. Most of these F_1 animals reared were found to be fertile. No implanted embryos, foetuses or living young were obtained when the spermatozoa were exposed to 1,000 r. or over. With doses of 2,500 r. and over, all the tubal ova obtained showed lack or arrest of development. The stage to which segmentation had proceeded showed a general relationship with dosage. Histological examination of the tubal ova showed that spermatozoa had penetrated the ova at all dose levels, but the process was often delayed. Polyspermy was not uncommon. With the higher doses, the male pronucleus was abnormal, syngamy was delayed and irregular, and many activated ova failed to divide. The arrest of segmentation was associated with the occurrence of irregular nuclei and anucleate or multinucleate cells. There was some evidence of slight activation without syngamy, but none of continued gynogenetic development, *i.e.*, of the Hertwig phenomenon.

DYBING, F. (1949.) Biologisk drektighetsdiagnose hos hopper ved hjelp av hanmus og hanrotter. [**Biological diagnosis of pregnancy in mares by means of male mice and rats.**]—*Nord. Vet.-Med.* **1.** 51–56. [English summary, slightly amended.] **217**

The effect of serum gonadotrophin on the seminal vesicles in infantile male mice and rats is employed as a basis for biological serodiagnosis of pregnancy in mares. The results obtained on employment of male animals were found to be

just as reliable as the results obtained with female animals, as in either case the percentage of error was about 1. The requirements concerning the age and weight of the male test animals have to be very strict, however, and this applies in particular to the infantile male mice.

WISNICKY, W., & CASIDA, L. E. (1948.) **A manual method for the diagnosis of pregnancy in cattle.**—*J. Amer. vet. med. Ass.* **113.** 451–452. **218**

A method is described whereby pregnancy in cattle can be accurately diagnosed between the 35th and 49th days of gestation by palpating the amniotic vesicle *per rectum*. The uterine horns are palpated, between the thumb and first two fingers, throughout their entire length, when the amniotic vesicle can be detected as a small, turgid, slightly oblong, balloon-like structure which slips away from between thumb and finger when attempts to palpate it are made. After the seventh week the amniotic vesicle loses its turgidity and cannot be readily identified. It is claimed that with experience the age of the foetus, correct to within a day, can be estimated when examination is carried out between the 35th and 49th days.
—A. T. COWIE.

KLOPPER, A., & FRANK, H. (1949.) **The use of English male toads in pregnancy tests.**—*Lancet.* **257.** 9–11. [Authors' summary copied *verbatim*.] **219**

A test for pregnancy by the injection of urine into male toads is described. A positive test is indicated by the appearance of spermatozoa in the toad's urine. A series of such tests performed on the English toad, *Bufo vulgaris*, is analysed. The results obtained by other workers on different species are confirmed. The test has many advantages over present biological tests, and further trial is urged.

MARCENAC, N., & VORS, J. (1948.) Greffes ovariennes intra-oculaires. Applications au diagnostic de la gestation. **[Intra-ocular ovarian grafts in pregnancy diagnosis.]**—*Bull. Acad. vét. Fr.* **21.** 98–103. **220**

After reviewing briefly the history of tissue grafts, particularly ovarian grafts, the authors describe their technique for transplanting whole foetal and portions of adult-rabbit ovaries into the anterior chamber of the rabbit's eye. Such grafts are said to "take" readily and, in the case of foetal grafts, assume a normal appearance in five or six months while adult auto-grafts appear normal in two months. Rabbits with such ovarian grafts are said to be useful test-animals for Friedman pregnancy tests on women's urine and mare's blood serum since the appearance of the ovary is always apparent, no laparotomies are necessary and repeated tests may be made on the same rabbit. No data of the reliability of such test animals are provided.—ALFRED T. COWIE.

DUTT, R. H., & CASIDA, L. E. (1948.) **Alteration of the estrual cycle in sheep by use of progesterone and its effect upon subsequent ovulation and fertility.**—*Endocrinology.* **43.** 208–217. **221**

The experiment was designed to show the effects on the reproductive cycle of the ewe of repeated injections of crystalline progesterone. Thirty Shropshire ewes at the beginning of the breeding season were allowed to go through at least one complete oestral cycle and the length of oestrus and of the complete cycle of each ewe were noted for control purposes.

Three groups each of six ewes on the fourth, eighth and twelfth days respectively after the first day of oestrus were given 14 daily injections of 5 mg. progesterone. Three similar groups each of four ewes were given 10 mg. daily. On each ewe laparotomy was performed on the day after the last injection to determine whether ovulation had occurred during treatment, and to make a detailed examination of the ovaries. Ewes having oestrus after treatment were artificially inseminated, slaughtered 36–48 hours later and a thorough search was made for ova. Those ewes not having oestrus were slaughtered seven days after the end of treatment.

The detailed results are discussed at length and the following conclusions are drawn. Both dosage rates suppressed oestrus, but three ewes on the 5 mg. rate ovulated. When treatment was completed oestrus occurred in all ewes in the 10 mg. group in from 3–3·5 days and in 12 of the ewes in the 5 mg. group in an average of 2·8 days. The length of the post-treatment oestrus was shortened, but not significantly and the number of ovulations was lower, being significantly so at the 5 mg. rate. The oestral cycles were lengthened by treatment. 67% of ova recovered from ewes on the 10 mg. rate and 44% of ova from ewes on the 5 mg. rate were fertile, though the authors point out that it was not known whether they would have developed into normal embryos.
—E. J. H. FORD.

PEISLEY, H. R. (1948.) **Stilboestrol trial for earlier lambs.**—*Yearb. Inst. Insp. Stk N.S.W. 1948.* pp. 61–68. **222**

A field trial to test the effect of stilboestrol injections in inducing earlier lambing is described. A flock of 356 maiden Merino ewes, aged 14–17 months, was divided into 179 controls and eight experimental groups of 20–25. Two groups were injected with 1·5 mg. diethyl stilboestrol subcutaneously and two groups intramuscularly. The

injection was repeated to one of each group after 16 days. The remaining four groups were treated similarly with 0·75 mg. diethyl stilboestrol. The injections had no practical effect in inducing earlier lambing.—D. F. Stewart.

Emmens, C. W. (1949.) **Hormones of importance in reproduction.**—*Aust. vet. J.* **25.** 185–189. 223

This is a review dealing with current concepts of the endocrinology of the non-pregnant mammal. The actions and probable functions of the pituitary and gonadal hormones are considered in connexion with the onset of puberty, the onset of seasonal breeding, the oestrous cycle, the development and maintenance of spermatogenesis and the accessory reproductive organs, and the progestational changes in the uterus and fallopian tubes. Attention is also given to details of the cyclic changes in the female genital tract, to the pituitary-gonad relationship, and to the anterior pituitary-like hormones.—C. R. Austin.

Everett, J. W. (1947.) **Hormonal factors responsible for deposition of cholesterol in the corpus luteum of the rat.**—*Endocrinology.* **41.** 364–377. 224

Oestrogen, luteotropin and LH (luteinizing hormone) were all found to have some effect on cholesterol deposition in the corpus luteum in sexually mature albino rats of the inbred Vanderbilt strain at known stages of pregnancy.

Administration of graded doses of 2 μg. or more of α-oestradiol benzoate to pregnant rats produces cholesterinization, the maximum deposition occurring approximately at the time of induced ovulation, 36 hours later. Hypophysectomy abolished this oestrogen effect.

Purified sheep LH (3·3 mg.) was injected into pregnant rats; at this dose level the preparation was free from FSH (follicle stimulating hormone) activity. On P.M. examination 18–24 hours later, ovulation and cholesterinization of the corpus luteum were found to have taken place. Hypophysectomy immediately after LH injection had no effect on the result, but if the rats were hypophysectomized 24 hours before injection no deposition of cholesterol occurred.

The corpus luteum of hypophysectomized rats, maintained by daily lactogen injections (20 I.U.) responded to LH injections (3·3 mg.) four days after hypophysectomy by cholesterol depositions, but an oestradiol injection failed to do this. In pregnant rats injected with LH and excess lactogen (100–300 I.U.) there was no cholesterol deposition in the corpora lutea.

It is considered that LH is specifically concerned with cholesterol accumulation in luteal cells while luteotropin is concerned with the later step of progesterone synthesis.—I. B. Ainsworth.

Thiéry, J. (1948.) Traitement de certains cas de stérilité de la jument par action sur le système meurovégétatif. [**Treatment of sterile mares with acetylcholine and pilocarpine.**]—*Rec. Méd. vét.* **124.** 317–323. 225

T. postulates two phases associated with ripening of the follicles. A vagotonic phase ending in maturity of the follicle and a sympathotonic phase allied with development of the corpus luteum. A method of estimating the tonus of mares is described and four mares with sympathetic or parasympathetic imbalance were treated with acetylcholine or pilocarpine with partial success.—G. V. Laugier.

Teunissen, G. H. B. (1946.) Een afwijking van het acrosoom (kopkap) bij de spermatozoiden van een stier. [**Abnormal spermatozoa in a sterile bull.**]—*Tijdschr. Diergeneesk.* **71.** 292–303. [French summary.] 226

During investigations concerning the aetiology of enzootic sterility in a herd attention was drawn to a 21-month-old bull grazing among the heifers. The animal appeared to have some female characters, but the genital organs were normal and it seemed to be healthy and free from tuberculosis. Possibly as a result of poor nutrition, libido had been strongly depressed at the end of the winter, but during the grazing season this had returned to normal. During the period from August to November the appearance of the semen was normal and the spermatozoa were motile and sufficient in number. At microscopic examination of preparations made by Indian ink 82–96% of the spermatozoa heads were found to have a clear, roundish or halfmoon shaped growth on the acrosome situated in the middle of the anterior end or a little to the side. This abnormal body is believed to be a remnant of the Golgi apparatus. Only 1–8% of the spermatozoa appeared to be normal. In spite of normal numbers and motility of the spermatozoa the bull had been completely sterile. Ability to produce lower pH and oxygen utilization was similar to that in normal semen. Among 60 bulls later investigated, T. found one other animal with the same abnormality.

[E. Blom (1948) found a sterile bull with this abnormality in Denmark.—Abstractor's note.]

—H. C. Bendixen.

Dinis, J., & Santos, A. (1948.) A persistência do corpo lúteo na economia bovina. [**Persistent corpus luteum in cows.**]—*Bol. pec., Lisboa.* **16.** 27–31. 227

From a Portuguese abattoir, the authors reported on a limited number of observations.

Among 111 cows slaughtered, 70 had been sterile, and of these, 68 presented a persistent corpus luteum, while two had follicular cysts.

From their own experience (no numbers stated), the authors concluded that the former affection, while causing sterility, by no means always implies suppression of oestrus. The authors consider that before such cows are turned over to the slaughter-house, enucleation could resolve the condition in many cases.

—G. P. MARSHALL.

BRISEMONTIER, C. (1946.) La gémellité dans l'espèce bovine. **[Multiple births in cattle.]**—*Thesis, Alfort.* pp. 76. **228**

The author finds that bovine twins most frequently arise as the result of two ova being fertilized independently by two spermatozoa. Although it is well established that there is an inherited tendency towards twinning, it is considered that the phenomenon ought to be regarded as pathological. It usually results from ovarian cysts, nymphomania or *Brucella abortus* infection in the cow, the inheritance factor mainly influencing the susceptibility of the parent to such conditions. The cow producing twins is predisposed to dystocia, uterine inertia, hydrops amnii or metritis and the calves are difficult to rear or are born dead. Diagnosis of a twin pregnancy is difficult, so that a careful clinical examination has to be made before it can be recognized. It is concluded that twinning in cattle has so many disadvantages that all possible steps should be taken to prevent its occurrence.—J. A. NICHOLSON.

THOMAS, Y. (1946.) Contribution à l'étude de la paralysie du part chez la truie. **[Parturient paresis in sows.]**—*Thesis, Alfort.* pp. 60. **229**

The symptoms of parturient paresis occurring *ante partum* and *post partum* are described in detail. The condition is considered to be a hypocalcaemia. Milk fever of the sow, while bearing a close relationship to the present condition, is considered to be a separate entity. Various factors which may have a bearing on the incidence of parturient paresis are discussed, *e.g.* gestation, lactation, parturition, individual idiosyncrasy, plane of nutrition.

Treatment recommended is by parenteral injections of calcium salts, and calcium and cod-liver oil by mouth. A number of case histories are presented, but no figures for serum calcium levels are given.—D. LUKE.

BRAMBELL, F. W. R. (1948.) **Prenatal mortality in mammals.** — *Biol. Rev.* **23.** 370 – 407. [Author's summary slightly amended.] **230**

The intention of this article is to provide a critical examination of the methods of estimating the amount, and of analysing the distribution, of prenatal mortality in mammals, in the light of researches on wild rabbits. The reasons why the rabbit provides particularly favourable material for such studies are considered. A summary of the oestrous cycle and embryology provides an essential basis for study of the prenatal mortality.

The size of litter at conception is limited by the number of ova ovulated at oestrus, which varies from species to species. The number ovulated at the preceding oestrus in any individual can be estimated from the number of corpora lutea in the ovaries. The magnitudes of, and factors responsible for, errors in such estimates are examined. The frequency distribution and the relation to body weight of the number of ova ovulated are examined. Transmigration of ova from one ovary to the uterine horn of the opposite side may occur.

Several indirect methods of estimating the total prenatal mortality are available, and both the conditions under which each is applicable and the limitations of the results which each can yield are analysed.

Estimates based on counts made at autopsy of corpora lutea and of surviving embryos are of little value unless counts of implantation sites are included. It is then possible to separate data of loss before implantation from those of loss after implantation. The nature and limitations of these two sets of data are different.

The data available in the literature of loss before implantation in various species are considered. The loss of ova before implantation in wild rabbits is between 10·2 and 13·0% of those ovulated, of which between 1·0 and 3·6% are lost in litters in which none of the ova survive to become implanted. The distribution of the loss and its significance are examined.

The data available in the literature of loss after implantation in various species are summarized. It is shown that estimates based on such data may be very misleading. Analysis of the loss after implantation in wild rabbits shows that not less than 35% of the litters surviving implantation are lost *in toto*, mainly between the 11th and 15th days postcoitum. Between 1·0 and 3·5% of the embryos which have implanted are lost in the surviving litters. The distribution of the mortality, which is complex, is analysed and the bearing of the statistical, histological and experimental results obtained on the problem of the causes of the loss is discussed.

The total loss of ova ovulated in wild rabbits both before and after implantation combined, but excluding loss at parturition, is 43·3% on the lowest estimate, of which total 10·2% are lost before implantation and most of the remainder before mid-term. The loss of ova in litters that do not survive is 35·7%, and in litters that do survive is 7·6%.

The method of removal of dead embryos from the uterus is described and the processes of

reabsorption and abortion are compared. The significance of these processes in relation to studies on prenatal mortality is discussed.

CALHOUN, J. B. (1949.) **A method for self-control of population growth among mammals living in the wild.**—*Science.* **109.** 333–335. **231**

Observations are reported upon an experimental colony of wild Norway rats (*Rattus norvegicus*), maintained in a 100 ft. square pen in which abundant food was available in a 20 ft. square central pen to which the animals gained access by four narrow passages or alleys. The colony was derived originally from five pairs of rats trapped on a 150-acre island, on which they had been effectively isolated for some 40 years and had fluctuated considerably in numbers, partly as the result of experimental reductions. It is believed that through gene drift a considerable degree of homozygosity had been attained among the approximately 150 rats on the island from which the five pairs were removed.

Rats living in the more distal areas of the pen had to pass near the burrows of rats living near the alleys in order to approach the food supplies. At such times they were often repulsed by the resident "alley" rats, particularly by lactating females. The animals living distally to the food supplies occupied lower positions in the social hierarchy. Individual females from a litter born in one of the alleys were found to grow much faster, and to manifest fewer wounds, than females from a litter born in the outer part of the pen. The total number of pregnancies resulting in the females of each of these two litters was 12, but whereas the socially-dominant, larger females born in the alley reared ten litters to weaning, the females from the distal part of the pen weaned only one litter. It is suggested that the histories of these females indicate a physiological or psychological disturbance in socially-inhibited individuals, which may result in a deleterious effect on the progeny, either through inadequate nutrition of the foetuses or from a breakdown in maternal instincts.—ALASTAIR N. WORDEN.

ANCEL, P., & LALLEMAND, S. (1941.) Sur l'action tératogène des hautes températures d'incubation chez l'embryon de poulet. [**The action of high incubation temperatures in producing deformities in chicks.**]—*C. R. Soc. Biol. Paris.* **135.** 221–223. **232**

Using their standard technique of manipulation and incubation at 37·5°C. the authors have never seen a case of malformation in the developing chick embryo. Their technique is to take the eggs from the incubator after 48 hours, remove 1–2 ml. albumen and to make a window in the shell about 1·5 cm. in diameter which is then closed by a thin plate of glass fixed in position by paraffin. Any eggs which have not developed at this stage are discarded.

When eggs are incubated at higher temperatures (39°–42°C.) a type of malformation known as coelosomia (hernial protrusion of the foetal viscera) may appear and be easily recognizable after the sixth day of incubation. Coelosomia may also be produced in chick embryos at normal incubation temperatures (37·5°C.) by certain chemical substances which have a teratogenous action, *e.g.* colchicine, ricin, trypaflavine, saponin, sodium cacodylate and sodium methylarsinate. When these substances are administered in teratogenous doses to developing chick embryos incubated at the higher temperatures (39–42°C.) they do not produce coelosomia but appear to stimulate those tissues which would be associated with coelosomia. They do produce some effect which is manifest as a slight ventral protrusion of the thoraco-abdominal organs, but this condition does not develop to coelosomia even in the later stages of incubation. Other chemical substances do not produce coelosomia at normal incubation temperature, but do so only if the embryo is incubated at 38–39°C.

The authors conclude that with the incubation temperature raised to 39–42°C. only a single type of malformation can be produced in the chick embryo, namely, coelosomia, and that in experiments, therefore, using teratogenous agents only the malformation of coelosomia is affected by raising the incubation temperature, and any other type of malformation which may be produced results solely from the stimulus of the teratogenous agent.—F. R. BELL.

BELONJE, C. W. A. (1949.) **Observations on reproduction in the thoroughbred mare.**—*J. S. Afr. vet. med. Ass.* **20.** 21–30 & 31–33. **233**

B. describes breeding conditions in thoroughbred mares in South Africa, from the viewpoints of physiology and pathology. He mentions some treatments for reproductive disorders.

Artificial insemination is not permitted in the Union of S. Africa except as an adjunct to natural service. Various pathological conditions in the breeding mare are described, *e.g.* anoestrus, abortion, iso-immunization and affections of the genito-urinary tract.—JAS. G. O'SULLIVAN.

See also absts. **51** (brucellosis and fertility); **163** (connexion with osteomalacia, haemoglobinuria); **171** (sheep husbandry); **173** (lamb mortality).

ZOOTECHNY

LAHIRI, J. M. (1948.) **Humane slaughter of animals.**—*Indian. med. Gaz.* **83.** 318–320. **234**

L. describes humane methods of slaughter and advocates enlightened legislation for the

abolition of some existing methods. He made a comparative study of the whole position, with special reference to the advantages and disadvantages of different methods of slaughter used in various countries and communities and considers that slaughter preceded by stunning and evacuation of the largest possible quantity of blood to maintain the keeping quality of the meat is the best method.—S. K. CHAUDHRI.

SMITH, V. R., & PETERSEN, W. E. (1948.) **The effect of preparation of the cow on the rate of milking.**—*J. Dairy Sci.* **31.** 589–593. **235**

See also abstr. **186** (dentition); **247** (depilatory); **266** (East Africa).

Six cows were milked twice daily; at the evening milking of one day and the morning milking of the next day the cows were stimulated before milking, at the successive evening and morning milking they were not stimulated. Ten milkings were recorded for each treatment. Stimulation consisted of a 10–15 sec. wash and massage of the teats and udder with water at 120–130°F., two min. before milking began. All six cows were found to have appreciably higher mean rates of milking when the udder was stimulated before applying the teat cups.—A. T. C.

TECHNIQUE AND APPARATUS

LANGERON, M., & LUTERAAN, P.-J. (1947.) Emploi des colorants acides en mycologie et en microbiologie générales. Coloration des ascospores des levures. **[The use of acid stains in mycology and microbiology.]**—*Ann. Parasit. hum. comp.* **22.** 254–275. **236**

A detailed critical review of the subject, preceded by a brief note on the use of basic stains in mycology, with the exception of the methods of Gram and Ziehl-Neelsen. The authors discuss the staining of yeast spores, including the methods they employed. They no longer employ methods based on those used for staining acid-fast bacilli. Results were obtained more easily, with greater transparency and better contrast, by making use of the oxyphilic nature of the spore wall. They recommend the three basic and the three acidic methods which gave them the best results.

—L. M. MARKSON.

MAITLAND, H. B., & MARTYN, G. (1948.) **A selective medium for isolating staphylococcus based on the differential inhibiting effect of increased concentrations of sodium chloride.**—*J. Path. Bact.* **60.** 553–561. [Authors' summary copied *verbatim*.] **237**

Robertson's meat medium with 10 per cent. of added NaCl is the selective medium of choice for isolating staphylococci. It will suppress the growth of most other bacteria and will detect a small number of staphylococci, calculated as about 10, in a large mixed inoculum.

Meat medium is less inhibitory to staphylococci than broth or agar with 10 per cent. added NaCl, and much less inhibitory than digest broth or Brewer's thioglycollate medium containing 10 per cent. added NaCl.

Substances which diminish the inhibitory effect of 10 per cent. NaCl on the growth of staphylococci are present in peptone, serum, blood extract and the liquid part of Robertson's meat medium.

In practice 10 per cent. of NaCl added to Robertson's meat medium proved highly satisfactory for isolating staphylococci from mixed inocula such as faeces, mouth washes, milk and ice-cream. Enrichment in this medium by incubation overnight followed by plating yielded pure or almost pure cultures of staphylococci.

YOUNG, J. L., STUART, R. D., & WILSON, W. (1949.) **Control of a contaminant by adjustment of environment.**—*J. Path. Bact.* **61.** 141–143. [Authors' summary copied *verbatim*.] **238**

Recurring contamination of gonococcal plate cultures with an organism resembling *Bacillus cereus* could not be controlled or eliminated by any of the usual procedures. Stabilisation of the humidity of the atmosphere in which the cultures were incubated by the use of a saturated solution of lithium chloride proved effective.

I. REED, R. W., & REED, G. B. (1948.) **"Drop plate" method of counting viable bacteria.**—*Canad. J. Res.* Sect. E. **26.** 317–326. **239**

II. CAMPBELL, J. J. R., & KONOWALCHUK, J. (1948.) **Comparison of "drop" and "pour" plate counts of bacteria in raw milk.**—*Ibid.* 327–329. **240**

I & II. A detailed description of a "drop plate" method of determining the number of viable bacteria in a fluid. The counts on pure cultures of various bacteria made by this method were about 7% higher than those made on the same material by a "pour plate" technique. The former method gave counts some 27% higher than the latter in a series of parallel counts on samples of raw milk. The "drop plate" method can be used for opaque as well as transparent media. Less satisfactory results were obtained with anaerobic organisms.—C. E. RICE.

HUDDLESON, I. F., & CARRILLO, C. (1949.) **The milk ring test for detecting brucella agglutinins in cow's milk.**—*Vet. Med.* **44.** 240–243. **241**

Solid transparent plastic blocks in which were drilled a series of holes were substituted for

test tubes and racks, and plastic tubes were used for measuring and mixing the milk; thus glassware was eliminated. The antigen was prepared by treating the brucella cells with a ferric sulphate solution as a mordant and then staining them with a modified Delafield's haematoxylin.

Dilutions of the antigen were added to 5 ml. of milk and kept for 1–6 hours at room temperature. Agglutination shows as a dark blue ring below the cream line.—J. I. TAYLOR.

BAYLISS, M., GLICK, D., & SIEM, R. A. (1948.) **Demonstration of phosphatases and lipase in bacteria and true fungi by staining methods and the effect of penicillin on phosphatase activity.**—*J. Bact.* **55.** 307–316. [Authors' summary copied *verbatim.*] **242**

The Gomori methods for acid and alkaline phosphatases and lipase were employed for the staining of a variety of bacteria and fungi. Localized areas within the organisms gave positive stains in certain instances, suggestive of an internal structure or inhomogeneity.

Manganous and magnesium ions along with alanine in the culture agar were demonstrated to activate the bacterial enzymes and markedly increase their staining intensity.

Penicillin, in concentrations sufficient to arrest completely the growth of certain bacteria, was found to have no significant effect on the phosphatase activities of these bacteria, as demonstrated separately by staining ability and quantitative measurement.

GOLDMAN, M. (1949.) **A single solution iron-hematoxylin stain for intestinal protozoa.**—*Stain Tech.* **24.** 57–60. [Author's abst. copied *verbatim.*] **243**

A single solution iron-hematoxylin stain is described for staining fecal smears rapidly and simply. The stain is prepared from the following solutions: Solution A: 1% hematoxylin in 95% alcohol, prepared by diluting a stock solution of 10% hematoxylin in 95% alcohol. Solution B: Ferric ammonium sulfate (violet crystals), 4·0 g.; glacial acetic acid, 1·0 ml.; concentrated sulfuric acid (sp. gr. 1·8), 0·12 ml.; distilled water, 100 ml. Mix equal parts of Solution A and Solution B; allow to stand overnight, filter and use. For maximum length of staining life, store in full, air-tight bottles. To stain fecal smears, fix in Schaudinn's, pass through iodine alcohol to 50% alcohol, stain for three minutes, wash in running tap water 5 to 15 minutes, dehydrate and mount.

GALL, D. (1948.) **A simple technique for the microscopy of living tissues *in situ*, with some observations on the splenic circulation.**—*Ann. trop. Med. Parasit.* **42.** 54–66. **244**

G. discussed the literature, with special reference to a method for illumination of the tissues to be examined. This is achieved by using a low voltage and directing the light of a straight-coiled, filament lamp of low wattage, on to one end of a transilluminating white glass rod, 6 mm. in diameter, drawn out at the other end to a point 0·5–2 mm. in diameter, bent at right angles to the rod. The point is placed under the tissue which is thus transilluminated by the transmitted light. The usual methods are adopted for maintaining the animal while under examination. The microscope is mounted on a freely movable arm.

Observations on the circulation of the living mouse spleen are described, indicating that the blood flows through the red pulp by haphazard channels between the splenic cells, the channels remaining fairly constant in the absence of extrinsic stimulation of the spleen. No rhythmical, intermittent activity of these channels was observed.—L. M. MARKSON.

STEWARD, J. S. (1947.) **The mounting of biological specimens in perspex (methyl methacrylate monomer). [Demonstration—Laboratory Meeting.]**—*Trans. R. Soc. trop. Med. Hyg.* **41.** 14–15. **245**

Preliminary preparation of the perspex consists of:– (1) removal of the hydro-quinone which stabilizes it, (2) dehydration with calcium chloride, (3) filtration, (4) 85 parts (by volume) containing 0·02% benzoyl peroxide (by weight), are mixed with 15 parts dibutyl-phthalate and heated in a boiling water bath or an oil bath at 130°C., (5) this syrup, when conveniently thick, is stored in a refrigerator until required.

The specimen is prepared by fixation, dehydration, and saturation with dilute perspex. After being placed in the cell containing the thickened monomer, the preparation is left at 40°C. for 1–3 weeks during which polymerization takes place. The block may then be trimmed and polished as required.—L. M. MARKSON.

CARPENTER, E. (1947.) **A mincing apparatus for the preparation of embryo extract for tissue culture.**—*Science.* **106.** 621. **246**

C. describes with the aid of diagrams a tubular cup the bottom of which is a perforated plate and the top having a thread corresponding to a thread on a plunger. The cup is held by a clamp and the plunger can be screwed into the cup by a horizontal handle.—L. M. MARKSON.

PITESKY, I., & LAST, J. H. (1948.) **An effective depilatory formula for use on laboratory animals.**—*Science.* **108.** 657. **247**

An effective depilatory for laboratory animals is made by triturating purified yellow barium sulphide with a detergent, *e.g.* dreft, a proprietary name for a surface active agent containing sodium

lauryl sulphate, in the proportions 2 : 1 by weight. About 30 g. of this preparation is mixed with 50 ml. of a 10% solution of glycerin in water to give a creamy suspension. This is applied to the thoroughly wetted skin, which is depilated in approximately five min.—E. PARKER POLLARD.

See also absts. **20** (TB. mouse test); **55** (blackleg vaccine); **58** (fungous diseases); **59** and **60** (complement fixation in histoplasmosis); **79** (fluorescence microscopy in trypanosomiasis); **81** (*Trichomonas foetus*); **86** (Aujeszky's disease); **144** (electron microscopy of neoplasms); **185** (electron microscopy of elastic tissue).

MISCELLANEOUS

WARREN, S. L., BRYAN, F. A., & BUETTNER, R. J. (1947.) **The atom bomb—hazards incident to its use.**—*Industr. Med.* **16.** 275–278. [Abst. in *Bull. Hyg. Lond.* **22.** 647–648, copied *verbatim.* Signed: R. E. LANE.] 248

This article is an account of the hazards incident to the use of the atomic bomb. It is pointed out that in the explosion of such a bomb the identity of atoms, and not merely their arrangement, is changed. This gives rise to heat, blast and radiation. At Hiroshima, fires sprang up simultaneously over a wide central area of some 4·4 square miles with a radius of 3,600 yards. Much of the energy is dissipated in heat and light, the intensity of which gives rise to flash burns. The duration of this intense light is so short that there is no time for the energy formed on the surface to be dissipated by thermal diffusion. It is therefore a pure surface effect. Flash burns produced charring of wooden surfaces within a radius of 3,000 yards. Blast destroyed everything within a radius of a mile.

There was a wide range of radiation :– (1) High frequency radiations; gamma rays and neutrons; (2) fission products; (3) induced radioactivity.

In both the Japanese detonations, the bomb was exploded at such a height as to give minimum radiation effects with maximum physical damage, with the result that 5 per cent. of the total casualties resulted purely from radiation sickness.

Mention is made of the later Bikini experiment, as a result of which ships were rendered uninhabitable for a number of years, and the contamination of marine life will prohibit the occupation of the lagoon for generations.

The only adequate control is international accord in uses of fissionable material, but, in its absence, safety must be sought in deep shelters and decentralization. It is suggested that the industrial medical officer must acquaint himself with the many aspects of nuclear reaction and its attendant hazards.

X-rays, gamma rays and neutrons have penetration powers and can cause internal as well as external damage. Beta and alpha rays are harmful only when the source is inside the body. Rays act by causing ionization, which gives rise to tissue damage. The more specialized the cells, the more vulnerable they appear to be. Temporary safe working tolerance limits are given. The difficulty of training staff to deal with the hazards of radiation is discussed. On one hand, familiarity is likely to lead to disregard of precautions, while in other people pathological fears arise. It is pointed out that the atomic bomb project was carried through without known injury to anyone who observed the prescribed precautions.

LEROY, G. V. (1947.) **The medical sequelae of the atomic bomb explosion.**—*J. Amer. med. Ass.* **134.** 1143–1148. [Abst. in *Bull. Hyg., Lond.* **22.** 805. (1947), copied *verbatim.* Signed: SYDNEY RUSS.] 249

There are four main destructive agents let loose when an atom bomb explodes. Casualty-producing agents resulting from an atom bomb are :– mechanical energy in the form of blast, heat, light, including ultra-violet, ionizing radiations (α, β, γ rays and neutrons).

The author attempts to evaluate these as causes of death due to wounds (fractures, lacerations or contusions) burns or pure radiation injury, mainly due to gamma rays. From the data given it is impossible to do this evaluation, but from this report and other sources of information it would seem that the deaths (80,000 at Hiroshima and 40,000 at Nagasaki) were ascribable to these agents in roughly similar numbers. The one unique type of injury caused by the atomic bomb was the syndrome due to gamma radiation. Exactly what dose of gamma rays the people immediately below the point of explosion experienced cannot be stated, but it was many thousands of times as intense as an ordinary beam of γ rays from a 5 gram Unit. People more than a mile away from the seat of explosion died from radiation injuries alone, the usual symptoms being vomiting and diarrhoea, fever, leucopenia, purpura, epilation and anaemia; those in the most intense zone died in 4–10 days, those a little more removed in 10–42 days, and those still further away in 30–90 days. Associated with the primary effects others developed; these included laryngitis, pharyngitis, and gingivitis; petechiae and purpura appeared in the skins of nearly all of the patients. Leucopenia was universal in the cases of radiation sickness and values as low as 100 white blood cells per cmm. were reported; recovery was rare with counts lower than 600 per cmm. The author states that the proper objectives in the treatment of such patients are :– to maintain fluid in acid-

base balance, to control infectious processes, to combat haemorrhagic tendency, to correct the anaemia.

CASE, R. A. M. (1949.) **A suggested explanation of the alleged phenomenon of symbiotic (bacterial) nitrogen fixation in whales.**—*J. Path. Bact.* **61.** 124–127. **250**

C. discusses the theory propounded by Laurie (1933) concerning the existence of a symbiotic nitrogen-fixing micro-organism in the blood of whales. He examined the blood of whales in the antarctic and found a mixed infection of many types of clostridia including *Cl. chauvoei* and *Cl. oedematiens*, streptococci and Gram-negative bacteria. He also found that the large muscles became infected very quickly after death.

He demonstrated that nitrogen fixation did occur in the blood of dead whales, but that it was caused by rapid contamination shortly after death and not by a symbiotic organism. The bacterial flora of the whale's intestine is probably derived from sea water which has an abundant population of nitrogen-fixing bacteria of both *Azotobacter* and *Clostridium* types.—M. C.

REPORTS

AUSTRALIA, NEW SOUTH WALES. (1948.) **Live-stock Diseases Report 1946/47, Department of Agriculture, Division of Animal Industry.** [HINDMARSH, W. L.] pp. 8. Sydney: [Mimeographed.] **251**

Udder infusions with penicillin resulted in the cure of over 70% of cases of STREPTOCOCCAL MASTITIS in cattle. There were 18 outbreaks of ANTHRAX, all within the recognized anthrax region, in cattle, sheep and pigs. Testing for BOVINE TUBERCULOSIS was continued and additional Protected Areas were declared. An outbreak of AVIAN TB. in the Lower Clarence District of the North Coast was followed by a survey which revealed that the disease was not widespread. No further cases of JOHNE'S DISEASE were found. Vaccination with strain 19 against BOVINE BRUCELLOSIS was being used more and more extensively. There were six outbreaks of CONTAGIOUS PLEURO-PNEUMONIA, all traceable to Queensland cattle which had been in New South Wales for some months. The complement-fixation test was widely used. Extensive vaccination was undertaken against CONTAGIOUS PUSTULAR DERMATITIS OF SHEEP following difficulties which arose from refusal by men to shear affected sheep.

The STICKFAST FLEA OF POULTRY, (*Echidnophaga gallinacea*) had become widespread in the Wentworth, Narrandera and Broken Hill districts. D.D.T. was providing very effective control. Work on the eradication of BOOPHILUS and TICK FEVER had been continued but had been hampered by flood damage to fences and shortages of materials for construction of dips and fences. There are also notes on the spread of *Siphona* (*Lyperosia*) towards the New South Wales border.

Research on TOXAEMIC JAUNDICE IN SHEEP continued in conjunction with the Council for Scientific and Industrial Research. The disease was found to be more widespread in New South Wales than was previously believed. Losses of crossbred ewes from the disease may hamper the fat lamb industry.

Low hatchability of eggs from fowls fed a restricted diet owing to the shortage of mill offals was due to RIBOFLAVIN DEFICIENCY, which was readily prevented by the feeding of riboflavin-rich supplements such as dried buttermilk. The keeping quality of eggs was not influenced by a high percentage of meatmeal in the diet. The system of feeding was not important provided the diet was adequate. OMPHALITIS IN CHICKENS was one of the most serious diseases of poultry and caused severe losses.

Mention is also made of CONTAGIOUS PUSTULAR DERMATITIS of sheep, ACARIASIS of pigs, WORM INFESTATION of cattle, nutritional studies with sheep, cattle and poultry, genetical studies on wool production and inheritance of skin folds in relation to BLOWFLY STRIKE in sheep, EXTERNAL PARASITES of sheep and poultry, ATAXIA, RACHITIS and "BENT LEG" of sheep, and synthetic oestrogens for fattening poultry.

A detailed account is given of the specimens submitted for diagnosis during the years 1944–47.

During the year administrative control of the Cattle Slaughtering, Diseased Animals and Meat Act was transferred to the Department of Agriculture from the Board of Health. There are statistics of border crossings, overseas movement of stock and number of livestock in New South Wales.—H. MCL. GORDON.

AUSTRALIA, NEW SOUTH WALES. (1949.) **Live-Stock Diseases Report, 1947/48, Department of Agriculture, Division of Animal Industry.** [HINDMARSH, W. L.] pp. 11. Sydney. [Mimeographed.] **252**

Not all cases of ARTHRITIS IN SHEEP are caused by *Erysipelothrix rhusiopathiae*. In a condition termed "arthralgia" there is considerable pain in the joints which causes unthriftiness in young sheep resulting from restricted foraging. No specific micro-organisms were found and there were no outstanding pathological changes in the joints. SWINE DYSENTERY has spread considerably. Neo-arsphenamine treatment has provided satisfactory control. An egg-grown vaccine against SPIROCHAETOSIS IN POULTRY is providing

satisfactory immunity throughout the life of the laying hen.

Large scale vaccination against CONTAGIOUS PUSTULAR DERMATITIS IN SHEEP is being adopted in consequence of industrial disturbance caused by infection of shearers. The incidence of the disease was high in regions where saffron thistle (*Carthamus* spp.) is prevalent. The sharp spines on this thistle cause considerable injury to the lips of lambs and permit entry of the virus.

D.D.T. provides satisfactory control of the stickfast flea (*Echidnophaga gallinacea*), and quarantine is now imposed only in isolated outbreaks of infestation or where it will deter rate of extension. A comparison of the preventive value of the Modified Mules Operation against BLOWFLY STRIKE in sheep [*V. B.* **16.** 352.] and the Manchester Operation (a method, covered by patent, for the destruction of wool follicles and stretching of the " bare area " by means of caustic preparations) was made in a field trial. The Modified Mules Operation was superior. The Manchester Operation involves dangers and difficulties in its application and a longer time is required for healing.

There was a marked decline in butterfat when cows were grazed solely on oat crops. The cause is not known. An unusual outbreak of TOXAEMIC JAUNDICE among Merino wethers is reported from the Nyngan district. The disease is rare in the Merino and this is the first record from the district in question. Control of outbreaks of the disease in cross-bred ewes used in fat lamb production is of considerable economic importance. Salt licks containing molybdenum are being used with some success. The cause of BENT LEG IN LAMBS is still obscure. The pathology of changes in the bones did not confirm suggestions that the disease is a form of rickets. ATAXIA IN SHEEP continued to occur in the central west of New South Wales. Field evidence suggests that it may be due to ingestion of *Tribulus terrestris*.

There are brief notes on diagnostic service, artificial insemination, nutrition of sheep, sheep breeding, veal calf raising trials, MASTITIS and penicillin, ANTHRAX, BOVINE TB. (including data from testing in the Milk Board Scheme), BOVINE CONTAGIOUS PLEURA-PNEUMONIA, SWINE ERYSIPELAS, BRUCELLOSIS, PULLORUM-free flock scheme, veterinary use of sulphonamides, " Elastrator " technique for castration and tailing of lambs, cattle tick and TICK FEVER, and statistical data on stock numbers and movements.—H. McL. G.

INDIA, ORISSA. (1948.) **Annual Administration Report of the Civil Veterinary Department, Orissa, for the year 1942-43.** [LAL, H.] pp. 28 + xxvii. Cuttack: Orissa Govt. Press. Rs. 1–9–6 or 2s. 5d. **253**

The department was in the administrative charge of an Indian Civil Servant assisted by one Deputy Director of Veterinary Services. The rest of the staff consisted of a Veterinary Investigation Officer, two Research Assistants and 40 Veterinary Inspectors and Veterinary Assistant Surgeons, the post of Livestock Inspector and Research Assistant having been newly created during the year. Thirteen students were allotted for education and post-graduate training to various veterinary colleges and institutes outside the province. The total cost of the department was Rs. 131,132.

1,557 outbreaks of contagious diseases were reported and 1,506 of these outbreaks were attended by the field veterinary staff. Contagious diseases reported included ANTHRAX, TB., JOHNE'S DISEASE, BLACKLEG and BOVINE CONTAGIOUS ABORTION. It was found from survey work that the incidence of BOVINE TB. in a herd of 59 bullocks belonging to the Puri Municipality was as high as 85%. Incidence of BOVINE CONTAGIOUS ABORTION was found to be high in a few villages in Ganjam district as judged by rapid agglutination test. HAEMORRHAGIC SEPTICAEMIA caused 419 deaths. F. & M. DISEASE was reported from all the districts of the province, there being 1,273 outbreaks and 54,750 cases. RINDERPEST caused 592 deaths in 86 outbreaks.

2,331 head of cattle were inoculated against ANTHRAX, 3,936 against HAEMORRHAGIC SEPTICAEMIA and 3,744 against BLACKLEG. 225,876 animals were protected against rinderpest, the methods used being serum alone, goat tissue virus alone or goat tissue virus in conjunction with serum.

The veterinary staff delivered 1,824 lectures to cattle-owners on improvement of livestock.

—M. R. DHANDA.

INDIA, ORISSA. (1948.) **Annual Administration Report of the Civil Veterinary Department, Orissa, for the year 1945-46.** [KUPPUSWAMY, P. S.] pp. 20 + xxvii. Cuttack: Orissa Govt. Press. Rs. 2–4 or 3s. 4d. **254**

The department remained under the administrative control of the Director of Development who was assisted in technical matters by the Deputy Director of Veterinary Services. The rest of the staff consisted of a Veterinary Investigation Officer and 42 Veterinary Inspectors and Veterinary Assistant Surgeons. Students were allotted for education and post-graduate training to various veterinary colleges and institutes outside the province. The total cost of the department was Rs. 393,509.

The department maintained the provincial Livestock Breeding Farm and a Military Dairy Farm was started during the year. Forty-one

breeding centres were maintained where services of approved bulls were made available to the public. Five similar centres were maintained for encouraging buffalo breeding. To avoid injudicious breeding the veterinary staff castrated 58,277 calves during the year. 62,253 animals were treated at the out-patients' departments of the seven veterinary hospitals and 24 touring dispensaries, and another 6,042 cases were supplied with medicine. In addition 65,375 cases were treated by stockmen in the districts.

Nine hundred and twenty-four outbreaks of contagious diseases affecting 32,472 animals were reported from the districts and 814 of these outbreaks were attended by the veterinary staff. There were 1,904 deaths resulting from contagious diseases. There were 82 outbreaks of HAEMORRHAGIC SEPTICAEMIA with 331 deaths; BLACKLEG had 17 outbreaks with 84 deaths. There were no cases of ANTHRAX during the year. The largest number of outbreaks were due to F. & M. DISEASE. RINDERPEST was responsible for 118 outbreaks resulting in 1,140 deaths.

14,406 animals were inoculated against HAEMORRHAGIC SEPTICAEMIA, 2,452 against BLACKLEG and 301,680 were protected against RINDERPEST by serum alone, by goat virus or by goat virus and serum combined, the bulk of the animals being given goat virus alone. 1,473 specimens were subjected to routine laboratory tests in the provincial Veterinary Laboratory.

The subordinate staff delivered lectures at various cattle shows, village schools and explained to the public the advantages and benefits accruing from the maintenance of improved livestock.

—M. R. DHANDA.

INDIA, ORISSA. (1948.) **Annual Administration Report of the Civil Veterinary Department, Orissa, for the year 1946-47.** [SINGH, G. B.] pp. 27 + xxvi. Cuttack: Orissa Govt. Press. Rs. 1-12-0 or 2s. 7d. **255**

During the year the administrative control of the department was placed in veterinary hands following creation of the post of Director of Veterinary Services as a result of post-war reorganization. A temporary post of Assistant Director was also created during the year. The other technical staff consisted of one Veterinary Investigation Officer, four Veterinary Inspectors, three Research Assistants and 38 Veterinary Assistant Surgeons. Fourteen students were allotted for education and post-graduate training to various veterinary colleges and institutes outside the province and two were sent for advanced training to the United Kingdom. The total cost of the department was Rs. 528,234, an increase of Rs. 134,725 over the previous year.

The provincial Livestock Breeding Farm and the Military Dairy Farm were maintained during the year. Schemes for improvement of cattle, sheep, goats and poultry continued to make steady progress.

Altogether 219,705 animals were treated in the seven hospitals and by touring veterinary staff. There was a downward trend in deaths from various contagious diseases. Among the diseases encountered were HAEMORRHAGIC SEPTICAEMIA, BLACKLEG, F. & M. DISEASE and RINDERPEST. 289,717 head of cattle were inoculated against Rinderpest (the majority with goat tissue vaccine), 16,647 against Haemorrhagic Septicaemia, 2,965 against Blackleg and 1,135 bovine and 133 other species against Anthrax.

Routine diagnostic work at the provincial Research Laboratory included examination of 1,382 specimens of bacteria, protozoa and helminths.—M. R. DHANDA.

INDIA. UNITED PROVINCES. (1948.) **Annual Administration Report of the Animal Husbandry Department, United Provinces, for the year ending 1945-46.** pp. 55. Allahabad: Supt. Printing & Stationery. 9 annas. **256**

This is a very detailed report on the varied activities of the department, which has been considerably enlarged by bringing under it the department for the marketing of fish, eggs, etc. Another important development was the establishment of a biological products section where 346,200 doses of HAEMORRHAGIC SEPTICAEMIA vaccine and 545,200 doses of RINDERPEST vaccine were produced during the year. A special desiccated goat spleen tissue vaccine was manufactured and tried on 60 cattle and buffaloes of various breeds by the scarification method and 38 of these animals gave thermal reaction indicating the viability of the vaccine used. This vaccine was incubated at 37°C. for one month, two months and three months. Two cows vaccinated with the one-month-incubated vaccine were tested for immunity with strong bull virus and the immunity was found to be solid up to four months (period tested). Immunity following the vaccination with desiccated goat spleen tissue "powder" vaccine and the goat spleen tissue "pill" vaccine was found to be 36 months and 13 months respectively (period tested). Experiments are being conducted to find suitable binding agents for the preparation of RINDERPEST "pill" vaccine.

Many other investigations such as the feeding value of different straws of the Province, the cause of non-bifurcated hoofs in Hariana cattle, induction of heat in cattle by the use of oestrogenic substances, etc., were undertaken during the year under report. An Animal Geneticist was appointed to carry out artificial insemination and to study disorders in breeding stock.

The staff consisted of 25 gazetted officers and 740 subordinates as against 16 gazetted officers and 554 subordinates in the previous year. The total expenditure of the department for the year was Rs. 2,646,582 as against Rs. 1,194,713 in the previous year and the receipts amounted to Rs. 558,318 as against Rs. 174,318 in the previous year.—M. K. SREENIVASAN.

BOOK REVIEWS

KELSER, R. A. [D.V.M., A.M., Ph.D.; Prof. of Bacteriology & Dean of the Faculty School of Veterinary Medicine, University of Pennsylvania], & SCHOENING, H. W. [V.M.D.] (1948.) **Manual of veterinary bacteriology.** pp. xi+767. London: Baillière, Tindall & Cox. 5th Edit. 36s. **257**

This is an attractive veterinary textbook of convenient size and excellent finish. The text contains up-to-date and reliable information and its 49 chapters reflect the experience of its two distinguished authors in both practical and theoretical aspects. The sections on practical techniques include essential culture and staining methods as well as serological tests, haematology, milk and water examinations and the production of antisera, vaccines, and veterinary biological reagents. The specific characters of the pathogenic bacteria are adequately described in 22 concise chapters. References to original papers are generously provided for the reader requiring more complete data. There is a large section dealing with the filtrable viruses. The several chapters on the protozoa and pathogenic fungi give a working knowledge of the more important species and their recognition.

Because of the scope of its contents and their clear presentation, this fifth edition will be given a warm welcome.—J. KEPPIE.

HOLMES, F. O. (1948.) **The filterable viruses. (Supplement No. 2, Bergey's Manual of Determinative Bacteriology.)** pp. xxiii+160. London: Baillière, Tindall & Cox. 6th Edit. 20s. **258**

This is a reprint of Supplement No. 2 of the 6th Edition of Bergey's Manual of Determinative Bacteriology and is an attempt to establish parallel systems of nomenclature for bacteriophages and for viruses of plants and animals.

The viruses of animals and insects are grouped together in the Sub-order ZOOPHAGINEAE containing six families of which one, the BORRELINACEAE, covers the viruses inducing disease in insects such as honey bees. The remaining five families of viruses of man and animals are BORRELIOTACEA inducing diseases of the pox group; ERRONACIAE inducing diseases of the encephalitis group; CHARONACEAE inducing diseases of the yellow-fever group; TRIFURACEAE inducing disease of the infectious anaemia group; and RABULACEAE inducing diseases of the mumps group.

Each of these families is divided into a number of genera and considerable ingenuity has been exercised in selecting names for these: for example, foot and mouth disease virus is in the genus *Hostis*, a name derived from the Latin "hostis"—an enemy; the influenza virus is in the genus *Tarpeia* derived from the name of a Roman maiden who treacherously opened a citadel to the enemy; while the genus *Tortor* from the Latin word meaning tormentor includes such major diseases as rinderpest, fowl plague, Newcastle disease and swine fever.

It is unlikely that the suggested grouping will meet with ready acceptance; for example, it is unexpected to find equine infectious anaemia and fowl paralysis linked together as the only two species in the genus *Trifur*, a name which in Latin means an arrant thief.

Under each virus there are notes on the common names, hosts, geographical distribution, symptoms, transmission, serological relationships, literature, etc.

These notes, in the case of the diseases of domestic animals, require revision as there are many omissions and inaccuracies. Examples which may be cited are bluetongue of sheep, the geographical distribution of which is given as South Africa, no mention being made of its occurrence in such places as Kenya and Cyprus. Fowl plague (*Tortor galli*) is said to be widespread in North and South America and in Asia, while for Newcastle disease (*Tortor furens*) the geographical distribution is given as England, probably [*sic*] East India, Korea, Japan, India and Australia, there being no mention of the U.S.A., of continental Europe, nor of Africa. Swineherds' disease now known to be caused by *Leptospira pomona* is listed as *Legio suariorum* in the genus containing viruses of the poliomyelitis group. In the list of hosts of rinderpest (*Tortor bovis*), species of the BOVIDAE only are given, there being no mention of the pig. The references to the literature are very incomplete in the case of the diseases of domestic animals; rinderpest may be cited as an example: here the only authors mentioned are Boynton, Daubney, Hornby, Pfaff and Weston. In the case of Newcastle disease the only authors cited are Burnet, Ferry and Doyle.—M. C.

MOULTON, F. R. [Edited by]. (1948.) **Rickettsial diseases of man. A symposium on the rickettsial**

diseases of man, organized by the Section on Medical Sciences of the A.A.A.S. and presented at the Boston Meeting on December 26-28, 1946. pp. 247. Washington: American Association for the Advancement of Science. 259

This symposium provides an excellent review of knowledge up to the end of 1946. Although there is only passing mention of the rickettsial diseases of animals, many of the chapters are of great interest and value to veterinary workers, particularly those dealing with the biology of the rickettsia; the classification of the organism; laboratory procedures for isolating and identifying rickettsia; vectors; reservoirs of infection and Q fever.

The subject is a rapidly developing one and many problems still await solution. This book provides a clear summary of our present knowledge and its value is the greater by reason of the good lists of references attached to each chapter.—M. C.

MOSCHCOWITZ, E. [M.D.; Physician, Mt. Sinai Hospital, New York.] (1948.) **Biology of disease.** pp. vii+221. New York: Grune & Stratton. 260

A series of essays, liberally supplied with references, illustrate the dynamic conception of the pathogenesis of a number of different disease conditions common in man. Among the conditions discussed are arteriosclerosis, leucaemia, arthritis, emphysema and nephritis. The theoretical views and some of the practical results could be used in dealing with comparable conditions in veterinary pathology. Diseases of the circulatory system are especially studied under such headings as predisposing causes, genesis, diagnosis, and sequelae. In connection with leucaemias, a plea is made for a decrease in the study of specific cells, and for a greater interest in the biological approach based on the changes in the cytoplasmic reticulum of the myeloid and lymphoid tissue.—J. KEPPIE.

CLARKE, H. T. *et al.* (1949.) **A symposium on the use of isotopes in biology and medicine.** pp. xiv+445. Madison: The University of Wisconsin Press. $5.00. [Second Printing.] 261

This volume is composed of 20 papers presented by authorities in the field of atomic energy at a conference convened by the Wisconsin Alumni Research Foundation in September 1947. The book was first issued in 1948 and reprinted in 1949.

It is in no way surprising that these papers should be in such demand since they form a comprehensive review of the present state of knowledge concerning the new tools, in the form of isotopes, which have now been placed in the hands of biological workers thanks to the atomic pile and the cyclotron. All aspects of the subject from the separation, preparation and detection of stable isotopes to their use in the study of intermediate metabolism and in therapeutics, as well as methods of handling and protection against their harmful effects, are dealt with. In this connexion, it is as well to appreciate that once an isotope has entered the body there is no method of reversing the radiation reaction and no antidote for overdosage.

Even the most cursory glance through these papers will make the reader aware of the immense field which has been opened for biological study. Already the use of isotopes as tracers has upset such conceptions as that calcium and phosphorus are absorbed in the small intestine and re-excreted into the large intestine, for isotopes clearly show that the greater part of the faecal calcium and phosphorus is derived from unabsorbed food residues, the remainder entering the gut by way of the bile, pancreatic juice and succus entericus. Many other of the older ideas will likewise have to be abandoned and there is no question but that this book will exercise a profound effect on veterinary science. It is to be hoped, therefore, now that isotopes are becoming more freely available, that veterinary workers will enter this field of research. In the meantime, however, no better preparation could be obtained than a careful study of the papers collected in this book.
—J. A. NICHOLSON.

SMITH, A. [M.D., C.M., M.Sc.; Director of the Division of Therapy & Research; Secretary, The Council on Pharmacy and Chemistry, The American Medical Association.] (1948.) **Technic of medication.** pp. xi+255. London: J. B. Lippincott Co. 24s. 262

The author has written a practical, sensible, and authoritative guide for medical students, "housemen," general practitioners, pharmacists, and nurses. Its usefulness would have been enhanced by greater economy in words. On the whole it should prove popular in this country with the type of reader for whom it is intended. Among the subjects discussed are oral, subcutaneous, intravenous, intramuscular, intraperitoneal, rectal, genito-urinary, and intracardiac administration; care of needles and syringes; applications to the skin; inhalation therapy; medication of the ear, eye, nose, mouth, and throat. The index might well have been fuller. The book is based on Bernard Fantus's *General Technic of Medication*, the third edition of which (1938) has long been out of print.—W. R. BETT.

PETERS, J. P. [M.D., M.A.; Professor of Internal Medicine, Yale University School of Medicine],

& VAN SLYKE, D. D. [Ph.D., Sc.D.; Member of the Rockefeller Institute for Medical Research.] (1946.) **Quantitative clinical chemistry interpretations. Vol. I.** pp. xii+1041. London: Baillière, Tindall & Cox. 2nd Edit. 38s. 6d. **263**

The first edition of "Quantitative Clinical Chemistry" is still a book to which many of us turn gratefully but, as is indicated in the preface to this second edition, the almost overwhelming speed of growth of both biochemistry and its applications to medicine, even before the outbreak of war in 1939, made a second edition of "Peters & Van Slyke" an eagerly awaited event.

In preparing this edition the authors, not unexpectedly, have found it necessary to devote two volumes to Interpretations. Volume one is divided into four parts, beginning with the overall energy exchanges of the body and part two, in which Long has collaborated, deals with the chemistry and metabolism of carbohydrates. The lipoids, steroid hormones and fat-soluble vitamins comprise part three, and the volume finishes with a series of chapters on nitrogen metabolism, the amino-acids, urea, ammonia, creatine and creatinine, and the purines and pyrimidines. Consideration of the plasma proteins has been deferred to volume two.

The range of biochemical literature which has been covered in the preparation of this volume may be gauged from the fact that, in all, over 4,500 references to original papers appear in the bibliographies at the ends of the chapters. The handling of this bulk of material must have been a formidable task but the text is, on the whole, well knit and readable, although in some cases the work referred to is not given as full a critical appraisal as might be desired.

Volume one of the second edition of this book will certainly maintain its place as a most valuable compendium of information relating to the practical applications of biochemistry to problems of human disease. It is to be hoped that the other two volumes will not be long in appearing.—R. H. S. THOMPSON.

DELORY, G. E. [M.Sc., Ph.D.; Assistant Professor of Biochemistry, University of Manitoba, Winnipeg, Canada. Formerly Biochemist, Royal Infirmary, Preston, Lancashire, England.] (1949.) **Photoelectric methods in clinical biochemistry.** pp. 10+90. London: Hilger & Watts Limited. 15s. **264**

This conveniently-sized and well-produced volume will prove instructive to all users of photoelectric colorimeters. The exposition of basic principles in the first three chapters is particularly clear and should be useful to any technician. Detailed working instructions for the two Hilger instruments are followed by 22 analytical procedures in note form for use at the bench. These methods are all rapid and of proven worth in medical biochemistry. References to the original papers are given. Noteworthy omissions from a veterinary standpoint are magnesium and ketone-bodies, but the book is not intended to be comprehensive. The strict avoidance of opacities in solutions to be read might have been mentioned —a point always emphasized by the protagonists of visual colorimetry. More might also have been said about the use of cells of different stratum thickness to avoid dilution or repetition of samples.
—M. L. BURDIN.

TOBIAS, N. [M.D.; Assistant Professor Dermatology, St. Louis University.] (1948.) **Essentials of dermatology.** pp. xvi+518. London: J. B. Lippincott Co. 3rd Edit. 36s. **265**

This is a handy, compact, comprehensive manual, with the minimum of description and the maximum of illustrations. The latter for the most part are clear and useful, except some in colour. In this third edition certain chapters have been revised, the rarer dermatoses have been omitted, the risks of local sulphonamide therapy are stressed, and a number of new photographs have been added. The veterinarian will find actinomycosis, rat-bite fever, anthrax, glanders, tinea, tularaemia, etc., discussed. The index is adequate and helpful.—W. R. BETT.

GADOLA, A. (1948.) Zootecnia profilassi e igiene zootecnica in Africa Orientale. Parts I & II. [**Zootechny, medicine and animal hygiene in East Africa. Parts I & II.**] pp. 230 & pp. 511. Rome: Istituto Superiore di Sanità. **266**

These two volumes provide a useful and interesting account of the livestock of the Italian colonies in Africa and of their diseases, and the organization and achievements of the veterinary services.

The first volume describes the breeds of cattle, horses, sheep, goats and camels with measurements of typical specimens. It also gives an account of the production of milk, meat and wool with a description of the method of feeding and managing livestock.

The second volume deals with the organization of the veterinary services, production of sera and vaccines, development of public markets for livestock and for meat, use of refrigerated motor vans for distribution of meat, improvement of hides and skins, etc.

There is a long and detailed account of the various diseases of domestic animals which occur in Italian Africa. The section dealing with rinderpest is particularly exhaustive.

The work is concluded by a summing up of

the achievements of the Italian veterinary and livestock services in control of disease and in improvement of livestock by importation of improved breeds.—M. C.

THORNTON, H. [B.V.Sc., M.R.C.V.S., D.V.H., F.R.S.I.; Chief Veterinary Officer, City & County of Newcastle upon Tyne.] (1949.) **Textbook of meat inspection.** pp. xi+659. London: Baillière, Tindall & Cox. 50s. **267**

Most of the books dealing with meat inspection that have been published during recent years are little more than précis of Oestertag's historic work. This book, however, approaches each aspect of the subject from the modern viewpoint and especially the viewpoint of the United Kingdom instead of that of Central Europe. It thus fills a long-felt want and should prove invaluable to those engaged in any branch of the meat industry in the United Kingdom.

The first chapter, a very brief account of the meat animals of the United Kingdom, can hardly claim to cover this branch of the subject and might have been omitted; but the description of modern abattoir practice that follows is particularly good and should be read by all who are engaged in the task of modernizing our own abattoirs. The brief chapter on P.M. inspection and the detection of substitution by anatomical differences has one or two slight inaccuracies which will probably be corrected in later editions. Chapter IV, devoted entirely to anatomy and physiology, is good.

The chapters on animal disease and the bacteriology of meat provide a good description of the diseased conditions affecting meat, together with carefully reasoned arguments as to the decisions to be reached and the action to be taken with regard to them. These chapters are perhaps somewhat too advanced for laymen, but those who read them will realize the need for a thorough scientific training in order that suitable judgments may be made concerning the various abnormal conditions. Excellent illustrations accompany the text, the coloured ones being particularly good.

The disposal of by-products and condemned meat is dealt with, and the preservation of meat by canning and cold storage. The final chapters dealing with rabbits, poultry and fish complete an excellent work.—R. MACGREGOR.

BOOKS RECENTLY RECEIVED

[Notice of recently received books in this list does not preclude review.]

BRUMPT, E. (1949.) Précis de parasitologie. [**Précis of parasitology.**] Vols. I & II. pp. 2138. Paris: Masson et Cie. Fr. 7,700.

FERRIER, A. J. (1947.) **The care and management of elephants in Burma.** pp. 188. London: Steel Brothers & Co., Ltd. 12s. 6d.

GALBUSERA, S. (1948.) L'Agricoltore veterinario. [**Animal Husbandry.**] pp. 284. Casale Monferrato: Casa Ed. Fr. Ottavi. 4th Edit. L.450.

HORSFALL, F. L., Jr. (1949.) **Diagnosis of viral and rickettsial infections.** pp. x+153. New York: Columbia University Press. (London: Geoffrey Cumberlege.) 30s.

KELLERMAN, R. (1949.) Milchwirtschaftliche Mikrobiologie. [**Microbiology of milk production.**] pp. 213. Hildesheim: E. Heinrichs. DM. 6.50.

KOCH, W. (1949.) Hormone und Hormontherapie in der Tiermedizin. [**Hormones and hormone therapy in veterinary medicine.**] pp. viii+86. Stuttgart: Ferdinand Enke. 2nd revised edit. DM. 7.80.

KUNERT, H. (1949.) Friedrich Karl Kleine. Ein deutscher Tropenarzt. [**A German medical practitioner in the tropics, F. K. Kleine. Collected papers arranged by Kunert, H.**] pp. 182. Hannover: Schmorl & von Seefeld Nachf. DM. 12.

MCEWEN, W. W. (1949.) **Bacteriological technique. A guide for medical laboratory technicians.** pp. viii+293. London: J. & A. Churchill, Ltd. 15s.

MANSFIELD, G. (1949.) **The thyroid hormones and their action.** pp. xii+157. London: Frederick Muller, Ltd. 24s.

NIETHAMMER, A. (1949.) Die Gattung Penicillium Link. [**The species *Penicillium* Link.**] pp. 123. Stuttgart/Z.Z. Ludwigsburg: E. Ulmer. DM. 8.

POPPMEIER, A. (1948.) Geschichte der Schlachttier- und Fleischbeschau in Graz und in Steiermark. [**History of cattle and meat inspection in Graz and Styria.**] pp. 103. Graz: Steiermärkische Landesdruckerei. DM. 46.

TRAUTMANN, A., & FIEBIGER, J. (1949.) Lehrbuch der Histologie und vergleichenden mikroskopischen Anatomie der Haustiere. [**Textbook of histology and comparative microscopic anatomy of domestic animals.**] pp. xii+400. Berlin and Hamburg: Paul Parey.

6056—Wt.P8—Dd294—4/50—H.R.G., Ltd.—G.18.

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INDEX VETERINARIUS

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